ENGINEERING AND MINING JOURNAL

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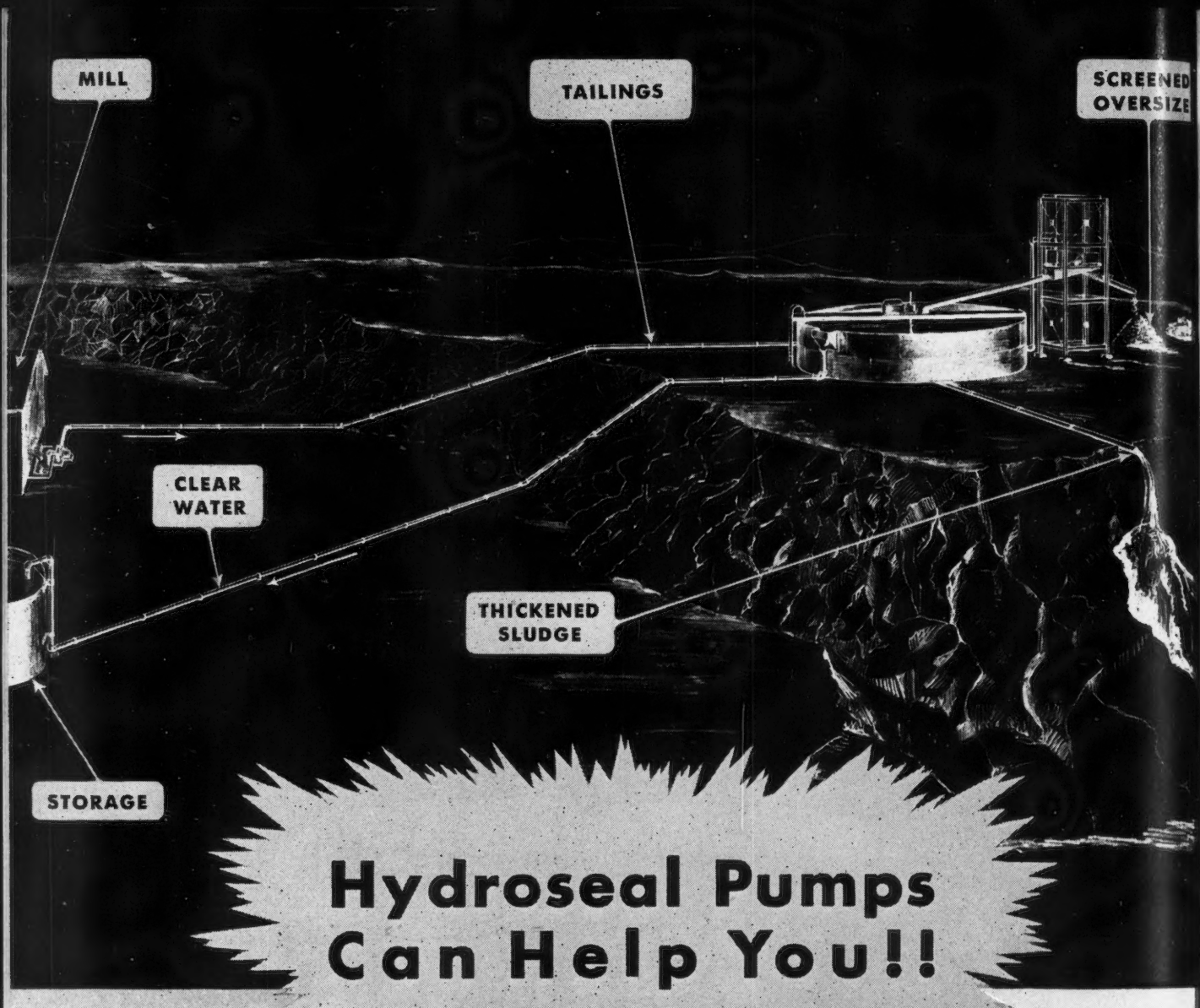
Long-hole Leyner drilling at National Tunnel and Mines Co., Utah

Mining Faces Active Future

Page 69



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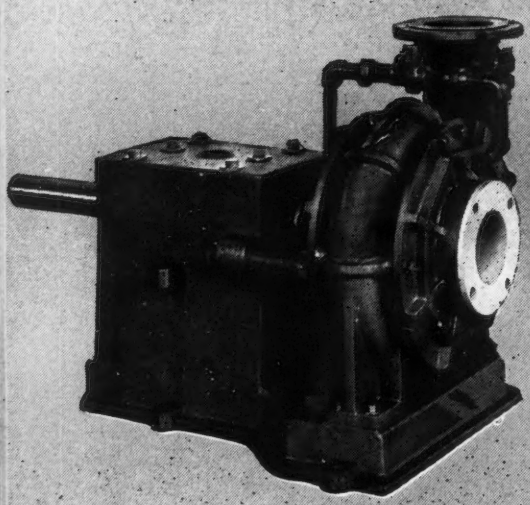

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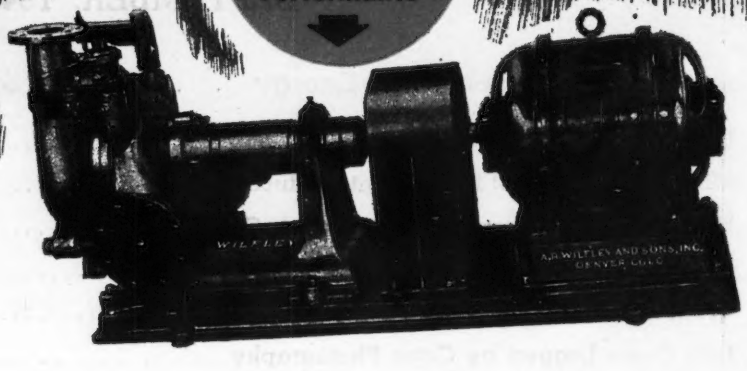

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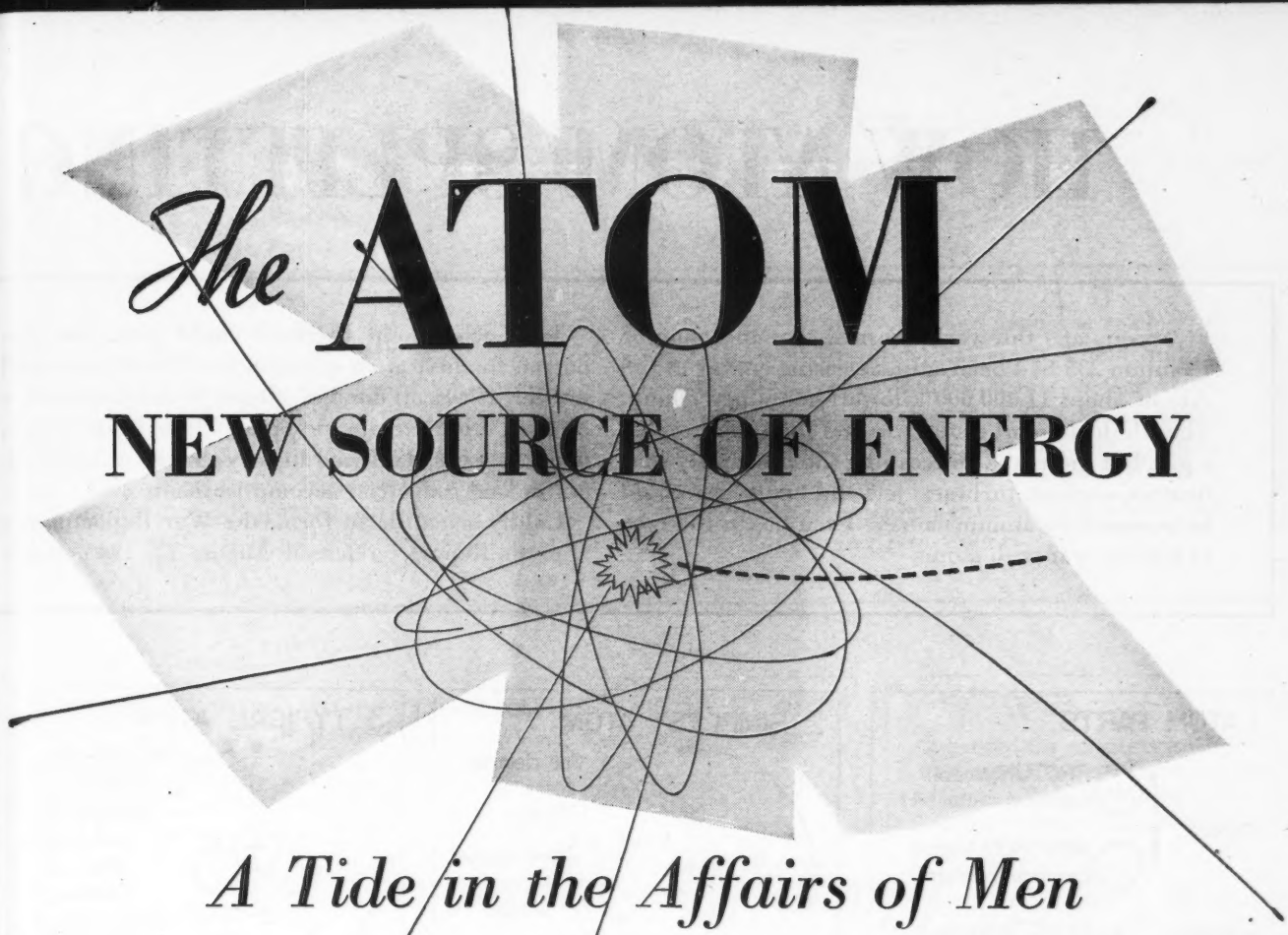
The ATOM
NEW SOURCE OF ENERGY



A Tide in the Affairs of Men

On August 6, 1945, an atomic bomb exploded over the Japanese city, Hiroshima.

Its concussion blasted the city, vaporized the fibre of Japan's will to resist, and flashed across the world a light of such glaring intensity that even blind eyes could glimpse the forked road that is presented to humanity's choice and destiny.

It has been a scant fifty years since Pierre and Marie Curie embarked upon their research with the avowed intent of discovering "how the atoms of the universe are put together". Their work contributed radium to the knowledge and use of mankind, but it marked only a way station upon the awesome quest which they announced and which thousands of scientists have since pursued.

Under the compelling stimulus of war, the first major application of the release of atomic force has been in an instrument that raises by an unimaginable dimension our ability to dole out death. We can be devoutly grateful that the scientific leadership of the Allies, and particularly the industrial strength of the United States, brought to us, rather than to our enemies, priority in the development of this dread weapon. But even in its present infant phase, it is clear that ownership of the principle of the atomic bomb carries a trusteeship of terrifying gravity.

We hold in trust a power that is capable of unraveling the very fabric of our civilization. Equally, it may be susceptible of development as a mighty force for human welfare. But we have proved the destructive use, while the constructive applications are still in the realm of speculation.

Clearly the trust is of a magnitude that transcends national jurisdiction. No walls have ever been built high enough to fence in the spread of scientific knowledge, and even if we were resolved to forego the harnessing of atomic power for peace, it is hopeless to think that its application for war can be held for long as the monopoly of one, or a small group of nations.

At one giant stride our scientific and technological development has so far outdistanced our social engineering, that we have no choice but to turn our full powers of creative imagination to control the forces we have unleashed and to bend them to man's use rather than to his destruction.

Since control is not possible without understanding, I have asked several of my editorial colleagues in the McGraw-Hill organization to present on the pages which follow a non-technical but authoritative account of the known facts and implications of atomic power.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Co., Inc.

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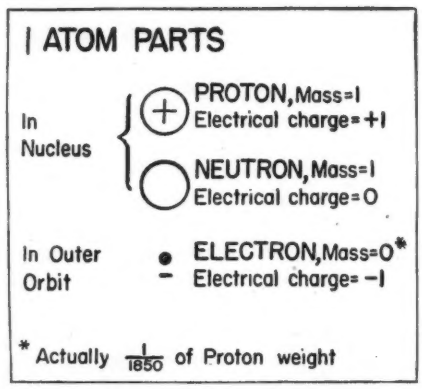
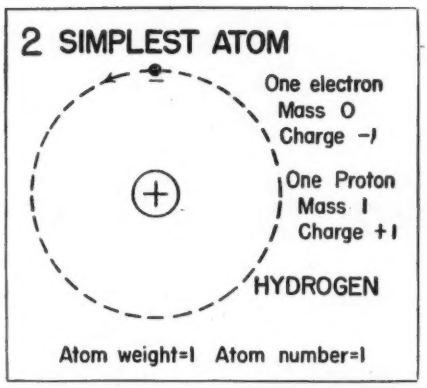
HOW ATOM SPLITTING

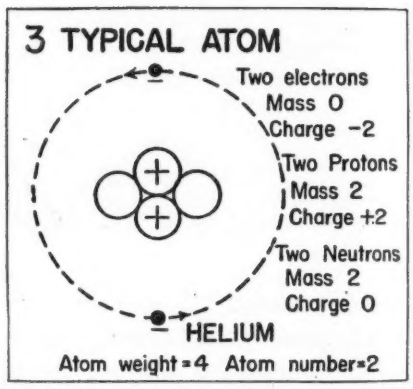
Five years ago the world learned that the atom of Uranium 235 had been split, releasing energy at the rate of about 11,400,000 kilowatt-hours per pound. The whole amount tested was less than the head of a pin, but there was no escaping the possibility that heaters, engines, turbines, jets and explosives could be powered by atomic energy. Then began the race to win the war with atoms.

With what help England could give, America outran the best atom-splitting team Germany could muster. It was all done in silence. From the summer of 1940 until the atomic bomb blasted Hiroshima, black secrecy blanketed history's most amazing scientific and industrial accomplishment.

Coldly scientific in form, the War Department's "Smyth Report," released August 12, 1945, traces

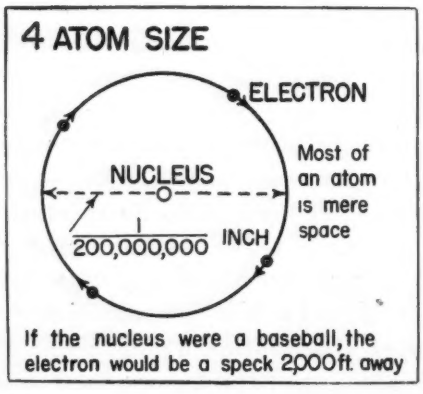


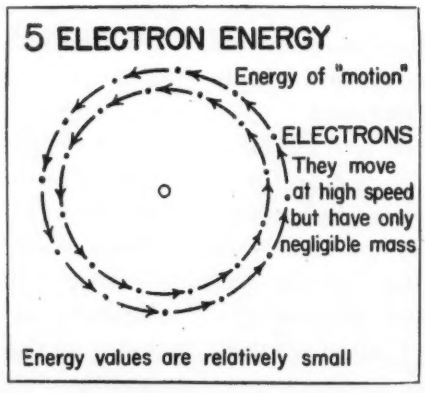


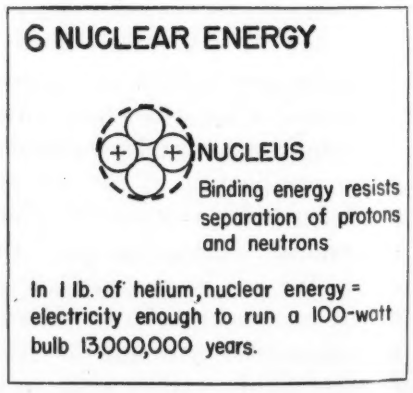


Each of the 92 elements has its own *atom*, yet all atoms are made from the same three pieces, Fig. 1: *proton* (weight 1, electric charge +1), *neutron* (weight 1, charge 0), *electron* (weight 0, charge −1).

Every atom is a tiny "solar system." Its central "sun" has one or more protons, generally neutrons too. The revolving "planets" are electrons, one for each proton in nucleus, because plus and minus must balance in the atom. The opposite charges attract, but high speed keeps the electrons out in their circular orbits, just as the centrifugal tendency of the revolving earth defies the sun's gravitational pull. All the weight of an atom is in the nucleus, so add the number of protons and neutrons to get the atom's weight. The *atomic number* is equal to the number of protons. The elements are known by their atomic numbers. Thus uranium (92 protons) is element 92.


4 ATOM SIZE
ELECTRON
NUCLEUS
Most of an atom is mere space
1/200,000,000 INCH
If the nucleus were a baseball, the electron would be a speck 2,000 ft away


5 ELECTRON ENERGY
Energy of "motion"
ELECTRONS
They move at high speed but have only negligible mass
Energy values are relatively small


6 NUCLEAR ENERGY
NUCLEUS
Binding energy resists separation of protons and neutrons
In 1 lb. of helium, nuclear energy = electricity enough to run a 100-watt bulb 13,000,000 years.

With only their outermost orbits touching, it would take half a million atoms to span the thickness of a human hair. Yet if one could expand an atom until its outer orbits encircled 100 acres, the nucleus would be no bigger than a baseball. The atom is mostly empty space, Fig. 4, and nuclei are difficult targets; so much so that a neutron bullet fired at a mass of atoms may pass right through without a hit.

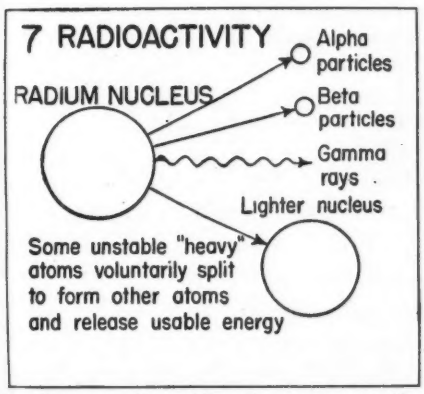
The almost weightless speeding electrons, Fig. 5, supply all the energy of chemical reactions (as when coal burns or TNT explodes). Evading all ordinary chemical action, the immensely greater energy bound up in the nucleus, Fig. 6, can be released only by direct hits on the nucleus to break the bonds that hold the protons and neutrons in a tight bundle.

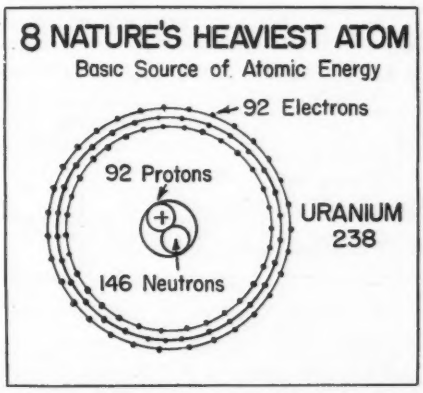
RELEASES ENERGY

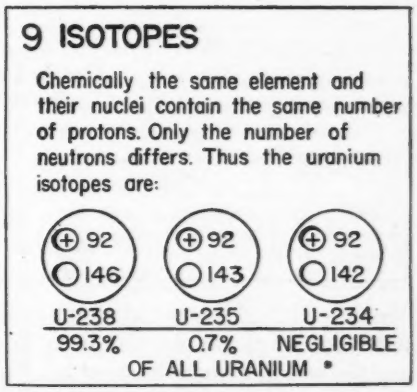
the fantastic course of atomic engineering through the five years of news blackout. It leaves no doubt that only a complete mobilization of America's technical resources could have won this victory in time.

Other writers in other places will unfold the epic story. This presentation leaves no space to reflect the glory of the accomplishment or even to record its history. The aim is more immediately practical — to give the professional and business readers of the McGraw-Hill publications a sound and honest, though non-technical, understanding of this atom-smashing business, so that they will know better what to do about it in their personal and business lives.

Now for step one: learning the shape of atoms and how atom splitting releases energy.

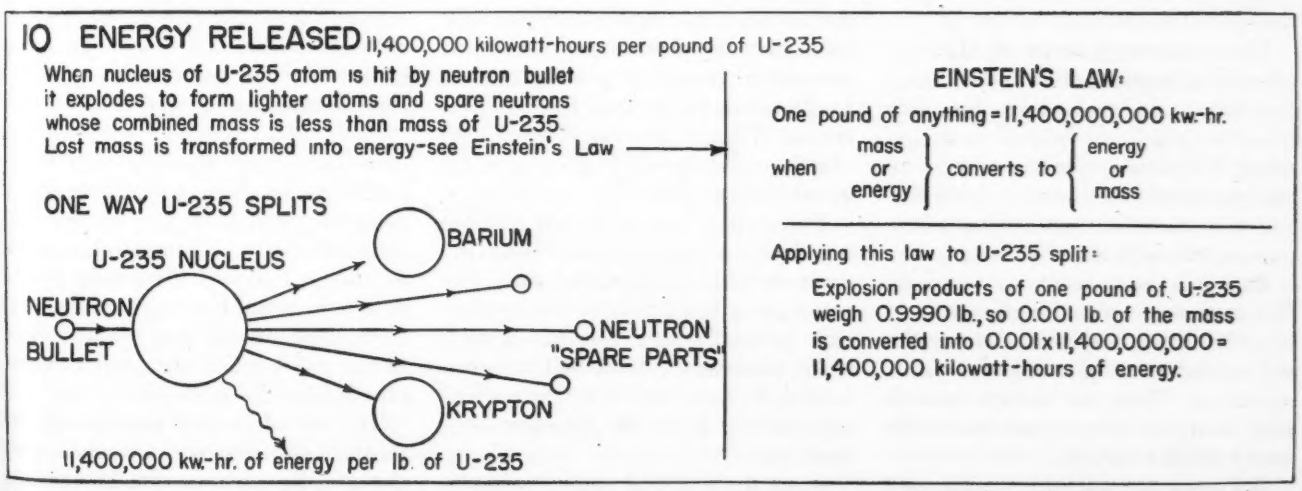






Radium nucleus, Fig. 7, automatically emits particles and energy as it decays to form nuclei of a lighter atom. Most common form of uranium, nature's heaviest atom, is Uranium 238, Fig. 8. This form is not directly useful for energy release, but is important as the raw material for a new synthetic power atom, *plutonium*.

An element may have several *isotopes* — alternate forms with the same number of protons but slightly different numbers of neutrons. Uranium 238 is the isotope in which protons and neutrons total 238 (so atom weight is 238). It is 99.3% of the total weight of pure, natural uranium. The stuff needed for direct atomic-energy release is Uranium 235, only 0.7% of the total weight and very difficult to separate from 238. To put it another way, every pound of energy-giving U-235 comes mixed with a dead load of 140 pounds of relatively inert U-238.


10 ENERGY RELEASED 11,400,000 kilowatt-hours per pound of U-235
When nucleus of U-235 atom is hit by neutron bullet it explodes to form lighter atoms and spare neutrons whose combined mass is less than mass of U-235. Lost mass is transformed into energy-see Einstein's Law
ONE WAY U-235 SPLITS
U-235 NUCLEUS
NEUTRON BULLET
BARIUM
NEUTRON "SPARE PARTS"
KRYPTON
11,400,000 kw.-hr. of energy per lb. of U-235
EINSTEIN'S LAW:
One pound of anything = 11,400,000,000 kw.-hr.
when mass or energy converts to energy or mass
Applying this law to U-235 split:
Explosion products of one pound of U-235 weigh 0.9990 lb., so 0.001 lb. of the mass is converted into 0.001 x 11,400,000,000 = 11,400,000 kilowatt-hours of energy.

Slow neutron bullet splits Uranium 235 nuclear target, generating two lighter atoms (Fig. 10 shows one possibility) and several free neutrons ready to split other U-235 atoms. The following pages show how the original neutron may be produced and directed and how a chain of self-propagating atomic explosions may sweep through a block of U-235 like a forest fire to release heat energy equivalent to 11,400,000 kilowatt-hours per pound.

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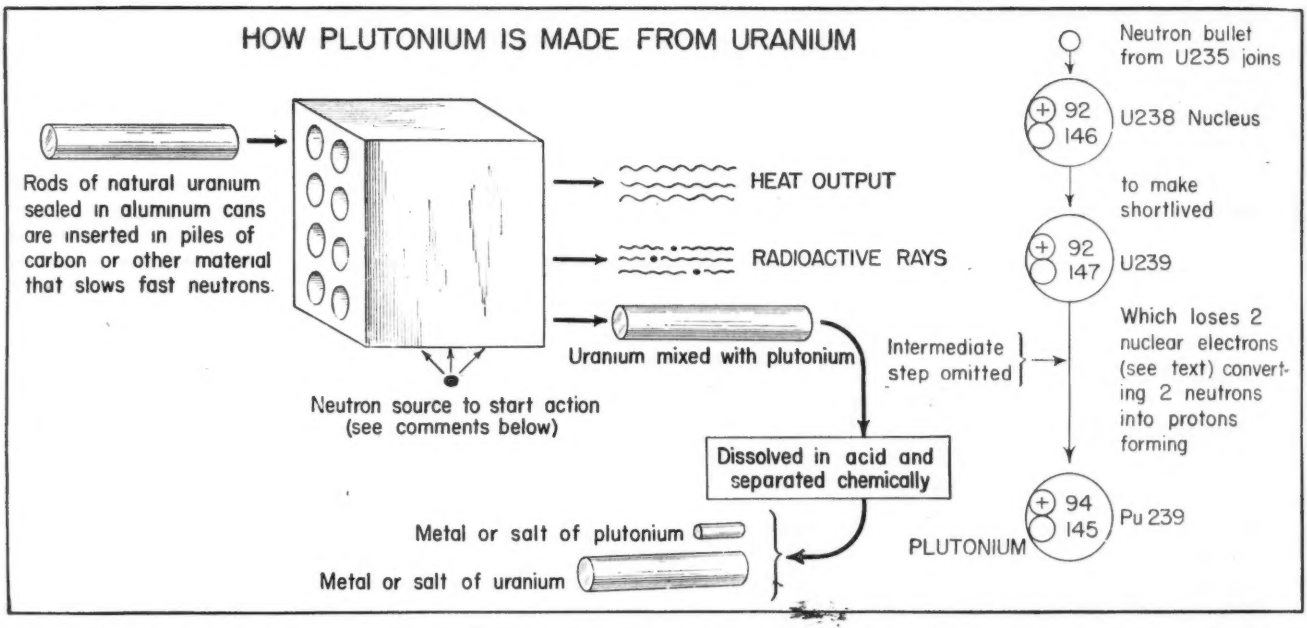
CREATING and ISOLATING

Man-Made Plutonium—U-235 Substitute


HOW PLUTONIUM IS MADE FROM URANIUM
Rods of natural uranium sealed in aluminum cans are inserted in piles of carbon or other material that slows fast neutrons.
HEAT OUTPUT
RADIOACTIVE RAYS
Uranium mixed with plutonium
Neutron source to start action (see comments below)
Dissolved in acid and separated chemically
Metal or salt of plutonium
Metal or salt of uranium
Neutron bullet from U235 joins
92 146 U238 Nucleus
to make shortlived
92 147 U239
Intermediate step omitted
Which loses 2 nuclear electrons (see text) converting 2 neutrons into protons forming
94 145 Pu 239
PLUTONIUM

We now have two kinds of atoms suitable for energy supply, Uranium 235 and the new man-made element No. 94, plutonium. Uranium, No. 92, has the heaviest atom of any natural element.

The Manhattan Project's plant, on the Columbia River at Hanford, Washington, is the world's greatest atom-making factory. Devoted entirely to the mass production of plutonium atoms, it uses U-238 as the raw material and U-235 as the energy source, intimately mixed in the same proportions as in natural uranium metal.

The production units at Hanford are several huge uranium "piles." Each is a very large block of graphite with holes in which are placed uranium-metal cylinders, sealed in aluminum cans to protect the uranium from corrosion by the cooling water constantly pumped through the pile.

Each pile runs itself, so to speak. Not even the conventionally pictured bits of radium, beryllium and paraffin are needed as a "pilot light" to start operation. There are always enough stray neutrons, or even cosmic rays, to start a chain reaction.

But once started, the design, size and control of the unit must be such that the chain reaction will continue at an even rate — neither die down nor overshoot into an explosion.

To see this picture in atomic terms, consider the fraction of a second in which one million U-235 nuclei are split, producing two million lighter atoms (say, one million of barium and one million of krypton) and between one and three million fast-moving neutron projectiles.

Some of these escape in free flight right through the relatively vast atomic "open spaces." Some are "captured" by the many U-238 nuclei, and others are captured by the impurities. But, on the average, of the one to three million, just one million neutrons must succeed in smashing another million U-235 atoms in the next fraction of a second. Thus, with reproduction rate exactly maintained, life goes on in the atomic-energy pile.

The carbon, one of several possible "moderators," serves to slow down the neutrons without capturing many. The chance of a fast, straight-moving neutron hitting a tiny nucleus is very small, whereas the "slow ball" neutron is likely to be sucked in by the nuclear attraction if it would otherwise be a near miss.

From the practical angle, maintaining a chain reaction requires careful design and good controls. The pile must be slightly larger than actually necessary for a chain reaction (that means scores of tons of material). Controls must be sensitive and dependable. They slow the pile down to the balancing point by sliding in retarders, such as strips of cadmium.

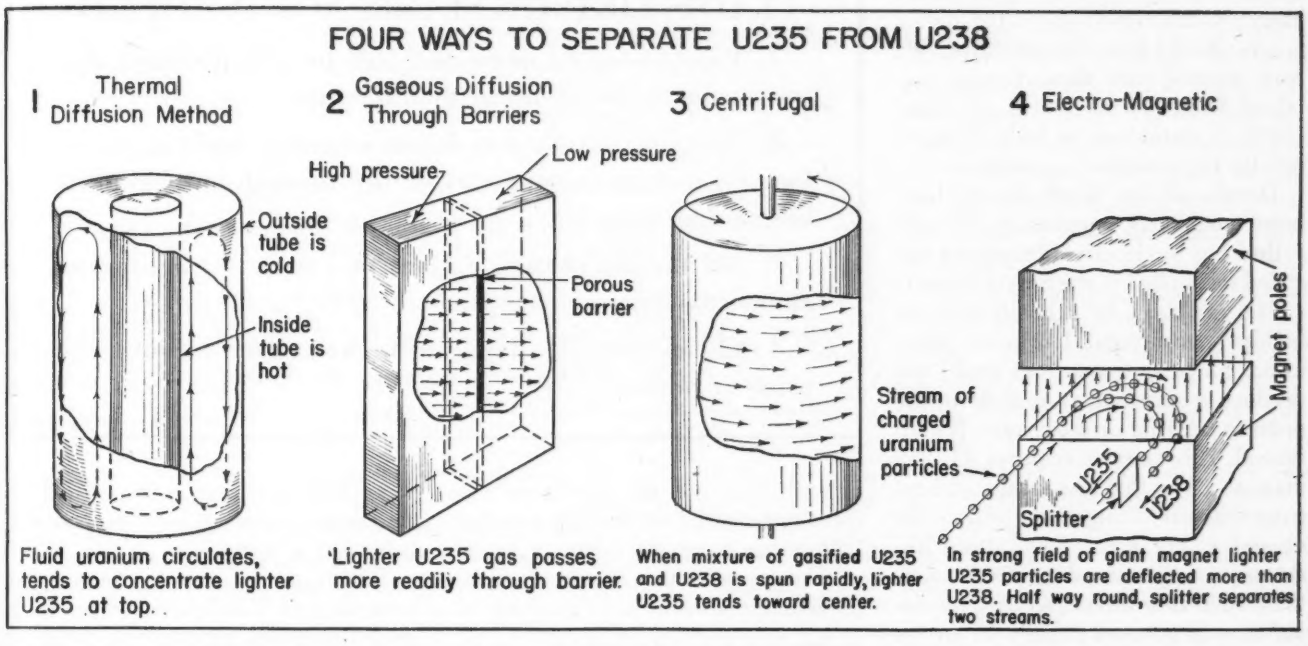
As already noted elsewhere, the energy released is about 11,400,000 kilowatt-hours for each pound of U-235 split. This energy appears first in the high speed of the pieces thrown off by the atomic split, then is converted to sensible heat as collisions slow down these projectiles. The energy is finally removed from the pile in the form of hot air, steam, hot water or other heated fluid in commercial quantity and thermal condition.

Such piles, operated with normal uranium, or with uranium enriched in U-235, would seem to be the primary means by which atomic energy will serve (if ever) as a commercial source of heat and power. Plutonium would be a byproduct, but might under certain conditions add to the energy yield of the pile without the need to separate it from the uranium.

The use of normal uranium in the Hanford pile sounds extremely attractive as a heat source, but has certain economic disabilities. Only a small part of the U-235 is used up before the pile must be shut down to remove the plutonium.

THE HIGH-POWER ATOMS

Isolating U-235 — a Gigantic Task


FOUR WAYS TO SEPARATE U235 FROM U238
1 Thermal Diffusion Method
2 Gaseous Diffusion Through Barriers
3 Centrifugal
4 Electro-Magnetic
Outside tube is cold
Inside tube is hot
High pressure
Low pressure
Porous barrier
Stream of charged uranium particles
Magnet poles
U235
U238
Splitter
Fluid uranium circulates, tends to concentrate lighter U235 at top.
Lighter U235 gas passes more readily through barrier.
When mixture of gasified U235 and U238 is spun rapidly, lighter U235 tends toward center.
In strong field of giant magnet lighter U235 particles are deflected more than U238. Half way round, splitter separates two streams.

Many of the uranium ores, including most samples of pitchblende and carnotite, will yield from 1 to 15% metallic uranium. Chemical separation of the metallic "natural" uranium is simple. Whatever the source, natural uranium contains the three isotopes in the constant proportions of 99.3% U-238 and 0.7% U-235, with traces of U-234.

Separating the U-235 from U-238, an operation essential for explosive uses of U-235, and probably important for future commercial controlled-chain piles, has been most difficult. Chemical separation was impossible because U-235 and U-238 are chemically the same.

The only possibility was a separation by physical differences, primarily a one percent difference in weight. The porous barrier and centrifugal methods pictured above required vaporizing a salt of uranium. All the methods shown have been used or tried on the Manhattan Project. All require many stages to achieve a substantial concentration of Uranium 235.

Dollarwise Thoughts on Atomic Energy

Costs mean little in war, but peacetime uses of U-235 and plutonium must pass the dollar test in competition with coal, fuel oil, natural gas, gasoline and electricity.

On the basis of energy costs only, "*all other things being equal,*" the table on the last page of this section shows at what price per pound U-235 would give the same energy cost as conventional energy sources selling at the indicated prices. For such comparisons it is convenient to remember that one pound of U-235 is equal (energy-wise) to about 11,400,000 kilowatt-hours, also to 1500 tons of coal, or 200,000 gallons of gasoline.

Fuel engineers understand the limitations of such oversimplified comparisons. Others should be warned that "all other things" are never equal. With this thought in mind, reconsider the uranium piles operated at Hanford to produce plutonium. These use U-235 in the cheapest form, say about $1400 per lb., assuming purified normal uranium at $10 per lb. (140 lb. of uranium contains one pound of U-235.)

If this were the whole story, coal would have to sell for a dollar a ton to break even with U-235 as a water heater. However, the pile using normal uranium must be immense to hold its own in a chain reaction. More important, the accumulating fission products "poison" the reaction after only a small part of the U-235 has been used up. Then the uranium cylinders must be removed for plutonium recovery. Finally, it has not yet been found possible to operate the normal-uranium piles at high enough temperatures for practical power production.

If we go to the other extreme and build a small pile, using concentrated U-235, we shall run into excessive material costs, perhaps several times the $52,000 per lb. set down in the table as the equivalent of 20-cent gasoline.

Something between the two extremes is likely to prove the most economical — perhaps a pile operating on a U-235 concentration between 1 and 10%.

The engineer of the "atomic-power age" must know the price of Uranium 235 *in various concentrations* and the characteristics of piles suited to them. No such information is yet available. He must also watch the danger from radio-activity; the requirements for radiation shields; explosion hazards, etc.

CONTINUED ON NEXT PAGE

WHAT TO EXPECT

Before discussion of possible and probable future applications of atomic energy to the arts of peace, the atomic bombs should have consideration. We may assume that these bombs contained from two to 200 lb. of either U-235 or plutonium, or both. No more precise information is available.

Details of the bomb design have been completely suppressed, but the following basic considerations are stated or implied in the Smyth Report:

The explosive in a bomb must be highly concentrated U-235 or plutonium. Since slow neutrons could not produce a satisfactory explosion, the neutron retarder or *moderator*, is minimized. This, in turn, requires a U-235 mass so large that the escape of neutrons without hitting nuclei will not be excessive. For every 1000 atoms hit, the neutrons produced must split more than 1000 new atoms, so that the reaction will proceed rapidly in an expanding chain, as sketched below.

There can be little leeway in the size of the explosive charge. For a given shape there is a certain "critical" weight of material. If this is exceeded the bomb explodes instantly. If the weight of charge is less than the critical, it cannot be made to explode.

Therefore, the critical mass must be created at the moment of explosion.

The Smyth Report suggests that this can be accomplished by breaking down the charge into two or more well-separated parts, each having less than the critical mass. At the appointed moment these could be brought together within the bomb to create a supercritical mass, which would then explode automatically.

CLAIMS LIKE THESE ARE NOT JUSTIFIED

1. Pretty soon no more coal will be mined except as a raw material for chemical manufacture.

2. In a few years a tiny bit of uranium, built in at the factory, will drive your car for life through an engine no bigger than your fist.

3. All the big central stations will soon be running on atomic power.

4. Cheap atomic energy will enormously reduce the price of power.

Peacetime Applications

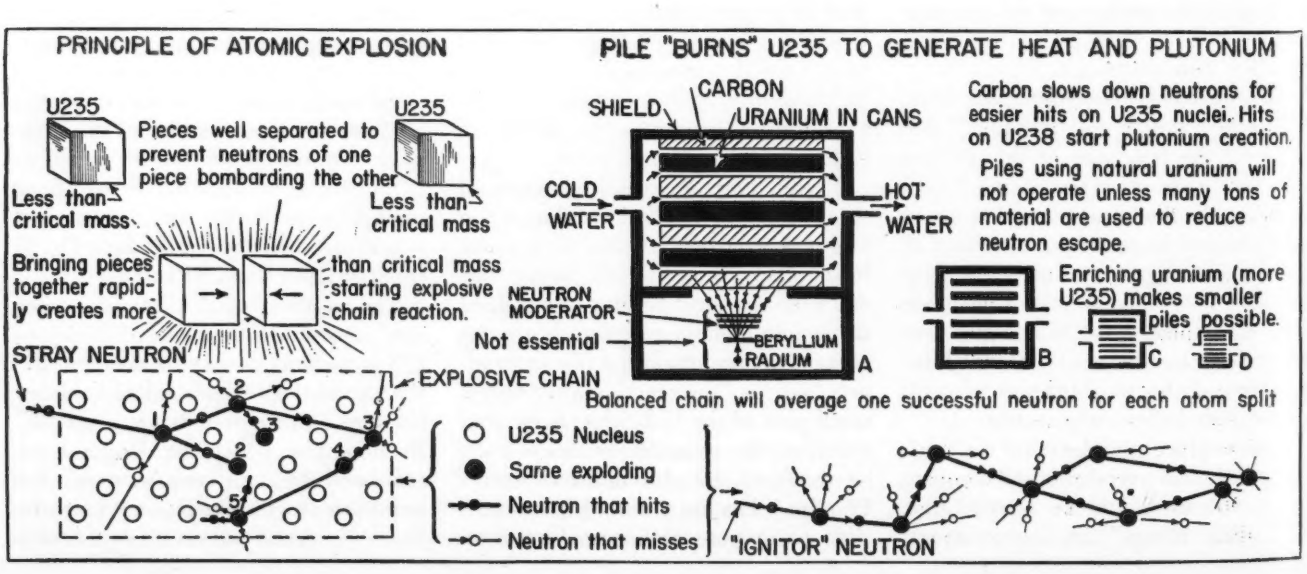
Except possibly for superblasting operations, uncontrolled explosive reactions cannot be permitted in the peacetime use of atomic energy. This means that the quantity of U-235 assembled in any one spot must always be kept well b`ow the critical weight to avoid spontaneous explosion.

Depending on the particular application, the most desirable concentration of U-235 may range anywhere from the 0.7% in normal uranium up to 100%, with the probability that many industrial applications will find the greatest economy in concentrations between 1% and 15%.

This matter of the degree of concentration of U-235 has received little public attention, yet nothing could be of greater practical importance. To make this point clear, consider the two extremes, 0.7% of U-235 and 100% of U-235, respectively.

The Hanford pile, using normal uranium (0.7% U-235) with carbon moderator, must be very large to work at all. It is inefficient in the sense that it must be shut down after a small part of the U-235 has been consumed. It cannot operate at high temperatures.

Its great advantage as a heat producer is the fact that its U-235 is bought at the lowest possible price. If


PRINCIPLE OF ATOMIC EXPLOSION
U235
Pieces well separated to prevent neutrons of one piece bombarding the other
U235
Less than critical mass
Less than critical mass
Bringing pieces together rapidly creates more than critical mass starting explosive chain reaction.
STRAY NEUTRON
EXPLOSIVE CHAIN
U235 Nucleus
Same exploding
Neutron that hits
Neutron that misses
"IGNITOR" NEUTRON
PILE "BURNS" U235 TO GENERATE HEAT AND PLUTONIUM
SHIELD
CARBON
URANIUM IN CANS
COLD WATER
HOT WATER
NEUTRON MODERATOR
Not essential
BERYLLIUM
RADIUM
A
B
C
D
Carbon slows down neutrons for easier hits on U235 nuclei. Hits on U238 start plutonium creation.
Piles using natural uranium will not operate unless many tons of material are used to reduce neutron escape.
Enriching uranium (more U235) makes smaller piles possible.
Balanced chain will average one successful neutron for each atom split

FROM ATOMIC ENERGY

. . . BUT REMEMBER THESE FACTS

1. The large-scale, controlled release of heat energy from U-235 has been fully demonstrated.

2. Beyond question, this energy could be applied directly for heating water and air, and making steam.

3. Such heat, in turn, could be applied directly, or converted into mechanical power or electricity by conventional steam turbines and gas turbines.

4. If and when U-235 in concentrations up to 10% costs less than $25,000 per lb., it may find applications, but will compete, at first, with premium fuels rather than coal.

purified normal uranium sells for, say, $10.00 per lb., the price of 140 lb. (containing one lb. of U-235) will be only $1400. This would be a very favorable price if the pile could operate efficiently with the 0.7% U-235.

Concentrating the U-235 to 100% would permit a much more compact and convenient pile — perhaps little more than small pieces of U-235, encased in aluminum to ward off corrosion, and immersed in a tank of water; this should convert the water into steam at a regulated rate.

In large part, the control would be inherent. The water as a moderator would keep the chain going, but if the reaction got too violent, the resulting higher superheating of the steam would decrease the moderator effect and thereby hold the reaction in check. Yet even if all this comes true the cost of concentrated U-235 in the near future will be many times $10,000 per lb.

Running up the concentration only a few percent above that in normal uranium may prove to be the way to get reasonable pile size and good efficiency without incurring exorbitant concentration costs.

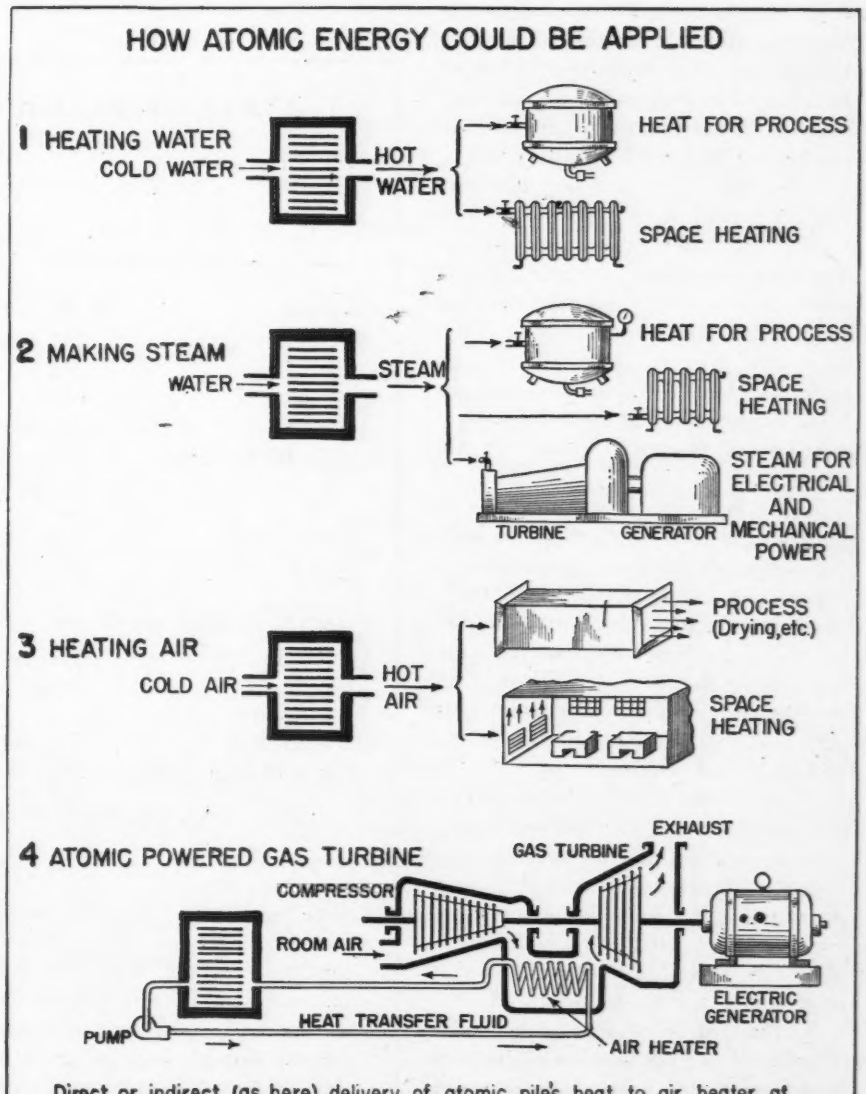
When atomic energy is applied, the starting point is heat, picked up by water, air or a special heat-transfer fluid. Intermediate heat transfer fluids may be essential in certain applications (space heating and service water, for example) where people must be protected from injury by radioactivity.

The intermediate heat-transfer fluid shown for the gas turbine would, of course, have to operate at temperatures up to 1200 F. There seems to be no basic reason why the pile itself could not be built inside the compressed-air receiver, discharging its heat directly to the compressed air.

With rather high concentration of U-235, this arrangement might be suitable for large airplane drive if excessive weight of radiation shields could be avoided.

Also, presumably, rockets and planes of the "buzzbomb" type could be powered by atomic heat delivered to the air of the jet steadily, not in puffs.

The sketches stress direct applica-



Direct or indirect (as here) delivery of atomic pile's heat to air heater at temperature above 1000F could operate gas turbine.

THESE THINGS MIGHT RESTRICT USE OF ATOMIC ENERGY

1. Ineffectiveness of large piles using normal U-235 concentration
2. High cost of concentrated U-235 for smaller, more effective piles
3. Danger from radioactivity
4. Weight and cost of shielding against radiation
5. Explosion hazard
6. Possible short supply of uranium
7. Governmental restrictions on atomic-energy materials

tions of hot air, steam and hot water to process and space heating. This emphasis is justified by the often overlooked fact that such applications of heat have many times the total energy value of all the electricity generated in the United States for all purposes.

There has been much popular speculation regarding the type of engines required for atomic-power generation. The answer is simple. Present engines, steam turbines and gas turbines can be used with little or no change. This, of course, does not rule out the possible discovery of specialized engines for atomic power, or even direct production of electricity from atomic energy.

In the long run the implications of atomic power are staggering for both war and peace. However, popular writers on the subject have undoubtedly created unreasonable hopes in the minds of readers — for example, the expectation that in two or three years the Detroit builders will market cars with built-in "lifetime" slugs of U-235 and "fist-sized" engines.

Yet it seems fairly safe to predict that atomic energy will find some commercial applications within the next five or ten years, first, probably, as a premium fuel like aviation gasoline, worth a fancy price for specialized applications where low weight or some other characteristic is important.

As the cost of concentrating U-235 is reduced and application efficiencies improved, atomic energy may compete with cheaper fuels, perhaps ultimately with coal.

Important non-power applications of atomic energy may well include the ultra-high-temperature processing and fabricating of materials — also, modern "alchemy": building and rebuilding atoms to create new elements and to produce old elements at lower costs.

Radioactivity obtained directly or indirectly from artificial atom-splitting should find many important medical and industrial applications.

Turning back to ordinary power applications, we must avoid the temptation to overstress the economic importance of lower-cost power fuel. Fuel cost is only about 17% of the gross receipts of the electric utilities. Here's another way to put it: If, after allowing for transmission losses, one kilowatt-hour delivered to the consumer from modern plants represents a coal consumption of 1.5 lb., and if the coal costs $5.00 per ton cancellation of the coal bill could not save more than ⅜ of a cent per killowatt-hour. And atomic fuel will certainly not be free.

Performance of the atomic bomb is a monument to the scientists who unlocked the secrets of the atom and suggested the basic technique of making plutonium and concentrating U-235.

From there on, the job was at least 50% engineering. The various big plants of the Manhattan Project are vast assemblages of pipes, tanks, boilers, valves, instruments and controls, installed and operated by engineers, largely designed by engineers. From now on, the speed with which atomic power becomes practical will depend on the effectiveness of the engineer-scientist team.

It is possible, of course, that national controls may completely upset the entire technical and economic pattern of this discussion. For reasons of national security the government may decide to control or restrict atomic-power materials, plants and operations in ways not yet determined.

U-235 COULD COMPETE AT THESE PRICES

other things being equal

Common fuel	*Assumed prices*	*Comparable prices for Uranium 235, dollars per pound (nearest thousand)*
COAL	$6 per ton	$9,000
(13,000 B.t.u.)	$12 per ton	$18,000
	$15 per ton	$23,000
FUEL OIL	2¢ per gal.	$5,000
(150,000 B.t.u. gal.)	4¢ per gal.	$10,000
	8¢ per gal.	$20,000
CITY GAS	50¢ per 1000 cu. ft.	$39,000
(500 B.t.u.)	$1 per 1000 cu. ft.	$78,000
NATURAL GAS	25¢ per 1000 cu. ft.	$10,000
(1000 B.t.u.)	50¢ per 1000 cu. ft.	$20,000
	$1 per 1000 cu. ft.	$40,000
GASOLINE	10¢ per gal.	$26,000
(150,000 B.t.u. gal.)	20¢ per gal.	$52,000
	30¢ per gal.	$78,000

BUT

Note that "other things" are never equal. U-235 in normal uranium form is by far the cheapest, but involves use of excessively large and inefficient "piles." The unit cost of the U-235 in enriched mixtures increases with the degree of enrichment. Over-all cost comparisons can be made only for a specified concentration of U-235 and for apparatus suitable for that particular concentration. Possible explosion danger and need to protect personnel against radiation are other important considerations.

ENGINEERING AND MINING JOURNAL

September, 1945

Atomic Fission Will Affect Mining

MAKE NO MISTAKE ABOUT IT—we have just passed a milestone in the procession of the centuries. The age of atomic power, with its vast potential for better living, its frightening possibilities for destruction, and its awesome responsibilities, is here.

If anyone assumes that a few nations can prevent many others from learning the secrets of atomic fission, he has not realized the widespread occurrence of uranium, the possibility of splitting other elements, and the basic simplicity of making atomic bombs. For better or for worse, atomic fission is destined to be widely available. Whether it will be a beneficent genie or civilization's Frankenstein monster remains to be seen.

We can be sure that the mining industry will be profoundly affected by this new development. Possibly, if we can keep the peace, we shall have such energies to devote to mining technique that we can mine far deeper, or extract minute percentages of valuable minerals from ore. Possibly greater amounts of metals, such as tungsten, chromium, nickel, molybdenum, and cobalt will be required for new high-temperature processes.

At the present time the mining industry has much at stake in the policy of stockpiling minerals as a military precaution. If, as seems possible, navies and great armies are now obsolete and war will become a fiendish inferno of remotely controlled destruction, possible plans for extensive industrial mobilization are also out the window. Possibly industry's vital spots may have to be buried or dispersed. Possibly war has at last become so horrible that it is no longer an acceptable alternative.

But all of this is speculation. We know nothing yet of possible defenses or on how grand a scale atomic warfare may be launched. Until the outlines of the new picture take more definite shape we can only pursue the policies already established. It will be many months, possibly years, before the Government will know what changes in stockpile policy are indicated. However, this much we know: any mineral stockpile for military preparedness must be in dispersable forms readily available for fabrication, such as ingot or rolled metal. We cannot depend on reserves of ore in the ground, or on concentrate stockpiles. During any war of the future it is a question whether we can afford to rely on great open pits, large exposed mills and smelters, or vulnerable transportation facilities.

Military Stockpiles Should Be Inviolate

A READER has voiced his objections to what he interpreted to be the views both of Mr. Hoover (*E.&M.J.*, July, p. 77) and ourselves (*E.&M.J.*, April, p. 91) over stockpile policy. His assumption was that we endorse the idea of disposing of military stockpiles when demand in excess of current supply tends to move prices upward.

We are shocked that our treatment of this subject allowed any room for such an interpretation, and hasten to say that if our language on this point was ambiguous, our views never were. Certainly, the simplest kind of logic would require that stockpiles set aside for military purposes should not be touched for commercial reasons.

Not only should military stockpiles be held inviolate for a national emergency, but we believe that the determination of the kinds and amounts of materials should be under control of the armed services, because the problem is strictly a military one.

Stockpiles as economic cushions, or buffer stocks, to protect domestic mining against excessive price fluctuations or a surplus of imports, should be part of a separate program under separate jurisdiction from a military stockpile.

When Mr. Hoover suggested establishing price levels somewhat above war prices for the sale of Government stockpiles, he was seeking to protect the price structure of the mining industry against arbitrary Government action, and at the same time to assure consumers that supplies will be available at a price. Like ourselves, he was certainly thinking only of those stocks in excess of military requirements.

True Ceiling-Price Production Is Conjectural

IN OUR JULY ISSUE we published a group of OPA charts showing premium and non-premium production of copper, lead, and zinc (pp. 88-89). Members of the industry have pointed out that any inference that all the ceiling-price production indicated could stand on its own feet at ceiling prices would be wrong. The only production which can indisputably be classed as at ceiling prices is from mines which have not received premium payments.

As any mine operator knows, a higher price or payment of a premium permits the mining of lower-grade or less accessible ore, which increases a mine's total production and raises its unit cost of concentrate production. Even though a subsidy may be granted only to production in excess of a quota, there is only one actual cost of production at a single property at any given time. In other words, every ton of concentrates produced has a different actual cost, and the only way of rationalizing costs is to deal in averages based on all the production from a given mine and mill for a specific period. The segregation of output into ceiling and premium production is artificial accounting. Also, it is impossible, until after they are separated, to differentiate costs of minerals which occur together.

Moreover, an expanded output affords an enlarged base over which to prorate fixed and overhead charges. Abandonment of premiums and a consequent shrinkage of production would lessen the total of such charges very little; they would simply have to be prorated over less tonnage.

What a mine will produce under conditions other than those prevailing is always uncertain, even to the operator. After certain mines began receiving premiums, what their production would be without premiums became conjectural. The uncertainty increased as conditions changed with the passage of time and as quotas were revised.

On balance, we agree that the abandonment of premiums, with wages and supply costs remaining constant, would find less production able to survive than the OPA charts suggest. Also, considering the persistent trend toward increased dependency on premiums, we must assume that current production is more dependent than that of December, 1944, the last month shown.

Ontario Mining Sets an Example

LEADERS OF OUR DOMESTIC INDUSTRY who are beset with operating problems, and dissatisfied with Government policy and law affecting mining, will find it profitable to study the effective methods of Ontario's producers.

During a recent trip through the Province, we noted primarily a spirit of willing cooperation between Government and industry. Constructive mining legislation is enacted because leaders of the industry assume the initiative, and through such instruments as the Ontario Mining Association, cooperate with the Minister of Mines and the Government-appointed Royal Ontario Mining Commission in recommending acceptable measures pertaining to mine taxation, security regulations, safety and health, and related matters.

Ontario's progress owes much to the willingness of mining executives to devote time and effort for the good of the industry. For example, a committee of managers and superintendents of leading mines is studying methods to eliminate cage disasters. One member produced a formidable pile of technical papers from many parts of the world from which he hopes to glean new ideas on rope inspection and cage safety devices. Technicians are devising new methods to test the strength of hoisting rope in place. Master mechanics are designing, testing, and redesigning types of safety dogs to eliminate defects. It is safe to predict that with such cooperating effort much will be accomplished.

Other groups are studying labor relations, mining legislation, rock bursts, silicosis, and public relations. The University of Toronto cooperates whole-heartedly. Everywhere there is evidence of industry initiative and a far-sighted objective approach.

Believing that in its own and the public interest the mining industry must assume more initiative in the determination of public and broad industry policy affecting minerals, we urge some study of the methods used and results obtained in Ontario.

From Chile come reports that "mining experts" forecast the end of gold as a monetary medium because the science of atom splitting will make it available from common metals! Poor gold—between Lord Keynes, Marriner Eccles, and now the Chileans, the experts just won't let it alone, yet the common people still cry for it.

The Marketing Committee of the Committee for Economic Development estimates that consumption in 1947 *of primary nonferrous metals will exceed* 1939 *by* 27 *percent.*

Mining Must Get Set for Efficient Production

During the next few months, with the tremendous adjustments of reconversion to solve, and an inevitable softening of mineral markets, many of our readers will be racked by doubts as to what lies ahead. To them we address this summary of the outlook, pointing out that there are firm foundations on which to base confidence in the future.

THE STATEMENT by our late President that "We have nothing to fear but fear itself" was never more true than right now. The forces of despotism have been vanquished, and there is a tremendous backlog of unfilled needs for durable goods by people who have the money to buy. Also, millions of consumers have learned to want higher standards of living. True, we have a colossal debt, but at least, owing it to ourselves, the debt problem is one of management. It does not involve any necessity to export our national wealth in order to pay it off.

Also, as Donald Nelson pointed out, for the first time in history our productive power is adequate to afford good living for all. If this statement was susceptible to any doubt, all reservations have been cancelled by our glimpse of the new world of atomic power. Now, certainly, it is true that man will no longer have any logical temptation to exploit other men in order to enjoy the material needs of good living. Our future is limited only by our willingness to live and let live.

World Needs Minerals

It will be nothing short of miraculous if reconversion is accomplished so expeditiously that there is no slackening of demand for the large output of minerals currently forthcoming. Nevertheless, a survey of the world's needs, for reconstruction and the fulfillment of world-wide ambitions for better living, can lead only to the conclusion that there is no permanent surplus of minerals. The basic task of the mining industry will be to find the minerals and develop the technology to fulfill needs whose potentialities are staggering. If in the United States, for example, we can simply develop the living standards we know are possible, the mining industry will be hard pressed to fulfill the demands on it for more than a few years, unless it undertakes a large-scale program of exploration and development.

If, on the other hand, domestic mining adopts an overly cautious attitude, fails to catch up the lag in development or hesitates to modernize its properties for maximum efficiency, then when the needs of a voracious economy overtake it, the industry may find itself fulfilling the predictions of the "have-nots" whose views it so deeply resents.

Prices Cannot Stay Down

Although prices of minerals in general may waver during reconversion, it seems unlikely that they will stay below the ceiling levels established during the war unless there is a general decline in wages and prices. The inflationary inheritance from the war will hardly permit any other result.

In this connection, it should be kept in mind that most foreign countries have experienced substantial price and wage inflation during the war. They will not be able to sell minerals in international trade as cheaply as before the war unless they experience profound deflation. The production cost of Chilean copper, for example, rose 62 percent from 1941 to 1944.

Quicksilver may be an exception because an extraordinarily high price was maintained, first by Government stockpile purchases and later by a wartime requirement whose peacetime applications are still uncertain. Copper can hardly be expected to drop below 12c unless the tariff is reduced. In the matter of foreign competition, the Chilean people exhibit a desire to exact all the tolls the traffic will bear rather than to depress the market with their output. Lead producers look to higher rather than lower prices.

The probable price of zinc is a puzzle, as there are large stockpiles, greatly expanded smelting capacity, and substantial foreign offerings. The stockpile should not be embarrassing, as it is less than expected military requirements. However, unless foreign smelters develop unexpected weakness in competition, it seems that our domestic zinc smelting industry will have a profound adjustment to make in capacity. This may lead to price warfare, but smelting costs are so high that, barring a general wage reduction, a price drop below ceiling levels would result in losses all around.

Inasmuch as the disparity between foreign and domestic costs is probably wider than the zinc tariff bridge, foreign offerings may be repressive to domestic activity. Zinc seems to present a case where Government purchase of surplus production and smelting of Government-owned concentrates, whether for military stockpiles or future disposal, would be justifiable, to maintain reasonable stability until the logical postwar balance of the industry becomes more evident.

Whether aluminum will stay at 15c, or drop to somewhere between that figure and 12c, is unknown, probably even to the producers, until they can learn what labor costs and efficiency will be. However, sellers of copper, lead, and zinc are mindful that aluminum will exert some pressure on their markets, even at 15c.

Even though peace in the Orient may make tungsten more plentiful, the growing demands for materials which can retain strength at high temperatures is a decidedly bullish element in the long-term outlook. On the whole, we look for increased usage of all the ferro-alloys, as light-metal competition and technological demands call for steel of higher strength or special properties.

No Dumping of Stockpiles

As we have stated for more than a year, even if the surpluses of minerals accumulated for war were available for disposal, there is no fundamental problem of mineral surpluses unless people simply refuse to resume the normal progress of civilization. However, the mining industry has been spared even the temporary difficulties of digesting mineral surpluses by adoption of a national policy of stockpiling essential materials as a military precaution.

Now, with the atomic bomb upsetting all previous ideas of military strategy, many will wonder with good cause if any scheme of industrial mobilization will fit the conditions of any future war, if it is permitted to occur. In other words, are any military stockpiles practicable, except a comparatively small store of materials for atomic bombs, robot projectiles, and super-airplanes? The speed with which the Jap war ended suggests equal speed for future wars, if any, leaving little time for use of stockpiles.

At present nobody can foretell with certainty how drastically or how slightly atomic fission will affect warfare and plans for defense. However, it can be said with assurance that military men, with characteristic conservatism, will not abandon current methods and precautions until they are sure of their alternatives. Therefore, before any change in policy, there will be at least ample time to bridge the reconversion period and hit the industrial stride indicated by the large backlog of deferred demands for all kinds of durable goods.

Moreover, assuming that in due course the decision of military strategists may be to dispense with large mineral stockpiles, the mineral producer can take courage from the fact that the New Deal and its characteristic vindictiveness toward industry are dead. There is no reason whatsoever to fear that any mineral surpluses will be sold except with caution and consideration of the mining industry's problems. Any contrary policy would benefit nobody and gratify only a crackpot fringe whose ascendancy is happily extinct. There will be no sane motive in dumping minerals, as people have learned that a large inventory of mineral materials is an asset under any circumstances, in peace as well as war.

Premiums Will Probably Continue

As to the copper-lead-zinc premium-quota plan, there is no present evidence of any broad willingness to continue subsidies after the expiration of present enabling legislation on June 30, 1946. In fact, it will be recalled that on signing this legislation President Truman stated his intention of asking for cancellation of these subsidies if war requirements of these minerals should slacken before next June.

Without questioning the President's sincerity in making this statement, we currently believe that the program will be permitted to run to its contemplated expiration date. The President made this statement during a hectic period when he was new to the office and confronted with a myriad of first-magnitude problems. We believe that if he undertakes to fulfill his stated intention, he and Congress will find such a course harmful to a portion of the country which will be having its full share of postwar problems. Also, he will discover that cancellation will provoke claims that are likely to total as much as any possible premium savings. Such a move would accentuate any tendency toward wage reductions and unemployment, and would reduce confidence in the integrity of the Government's commitments. Believing the new President to be a man who partakes of and appreciates the virtue of simple honesty, we think he will do everything possible to restore the integrity of Government.

Imports Can Be Handled

There is every reason to believe that Government mineral imports will be given over to private hands as rapidly as this can be done without disrupting commerce. Such a policy has already been established, and there is no reason to expect a change.

However, it seems entirely possible that as a Good-Neighbor obligation our Government may resort to purchasing minerals from Latin American countries in order to prevent the present disruption of their economies from becoming too serious. Because the war starved ordinary international trade for lack of available ships, and because of our abnormally large purchases, countries such as Bolivia, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela developed an extraordinary dependency on our trade and suffered seriously from inflation. Currently the curtailment of our purchases, the lack of ships, and the paralysis of European markets have crippled their internal economies without affording any supply of goods to check inflation.

Naturally, if conditions fail to improve, we can expect resentment over our part in creating the present situation, and political disturbances not to our advantage in these countries. Such difficulties could be easily avoided by our continuing to purchase their minerals with a view to disposal in their normal markets when the enormous demands of world recovery get under way. Our Government's investment would involve little risk because of the indestructibility of the purchases; the domestic miner need have no fear because there would be no invasion of his normal market; and domestic smelters might be helped over a rough period if they could be permitted to reduce the concentrates involved to metal.

No Early Tariff Changes

The development of a sound mineral tariff policy is vital to the entire mineral industry, domestic and for-

eign. With competent mineral specialists having grave doubts that some existent schedules give adequate protection to domestic industry, but with Government and the public generally favorable to increasing international trade, it is impossible to predict the future. We have attempted to point out solutions that would afford suitable protection without putting undue burdens on the logical level of imports, but it would be untruthful to say that the mining industry has yet recognized either the complexity of the tariff problem or the inadequacy of the status quo.

Whatever the future may hold, we think that there is little cause to expect any tariff changes in the next few months. On the one hand, the domestic producer who seeks higher protection will have an uphill battle against the dominant public attitude of today. On the other, we believe that, in such hands as Truman's, Byrnes' and Clayton's, our trade policy will be a cautious one. Being practical rather than blindly zealous, these men will perceive that the United States cannot go much further on the road of international trade cooperation if Great Britain insists on Empire preferences, monopolistic cartelization, and blocked exchanges, or if Russia uses its unified bargaining power aggressively. Undoubtedly our statesmen will look for some tangible signs that international commercial cooperation is a two-way street before undertaking further surgery on protection of domestic industries.

Many domestic interests have insisted that the Government must not allow minerals imported on Government account without tariff charges to be sold without paying the duty. Our view is that it is a mere technicality whether the Government pays itself a duty, and that the important point is that the Government should not demoralize markets with any offerings it may have out of surplus.

Over the fears expressed that there may be equivocal interpretation of the emergency lead and zinc rates in the Mexican agreement, we believe that the Truman Administration has given every evidence of being straightforward. To assume that it will be otherwise over the meaning of "emergency" is simply borrowing trouble.

Development Work Backlog

The mining industry has been under such pressure to produce with inadequate labor that a large proportion of mines are seriously behind in exploration and development. It seems more than likely that there is plenty of such activity waiting to be done to balance all the slack in mineral markets that reconversion may entail. Also, in many cases mines will be able to improve their competitive status by modernizing equipment for lower-cost production.

Mining enterprises are among those industries that were given permission on Aug. 21 to begin any desired new construction without WPB authorization. By this move the WPB hopes to speed up the flow of goods from raw material to finished products. Mining men will also be able soon to purchase needed equipment with much greater freedom than in the past.

Mines Need Good Labor

At first glance, the war's end would seem to have put an end to mining's toughest wartime problem, that of manpower. From the Army, the Navy, the shipyards, the plane plants, and the government projects, a flood of men and women is spreading over the land in search of old or new jobs.

For some time at least, mining companies can offer a job to any ex-miner who wants to come back into the fold. Mines will go back to a 40-hour week, and all sorts of dormant jobs will again be filled and active. Undoubtedly there will be more and better men available to some mines.

But will enough good miners want to come back to mining? It is nice down in Portland, Seattle, Oakland, or Los Angeles. Wives, especially, like it there, and a lot of discussion, far, far into the night, is likely to follow a man's decision to move his family back to a mining camp. Furthermore, a good miner can do nearly anything well and usually makes a prized workman wherever he is. Consequently it appears likely that some men will return to mining because they want to; many will return only if they have to; many more will never return, because they've got on well somewhere else.

Two things stand out as advisable courses for mining companies in the light of the foregoing possibilities. The first is to offset losses of men by developing or continuing training programs, especially for supervisors. Experience during the war has shown the effectiveness of systematic training, both of workmen and foremen.

Second, it seems advisable for mining companies to re-examine the possibility of making mines and mining camps more agreeable places in which to work and to live. Some mining communities are attractive, but a good many others definitely are not. Future efficiency will be seriously hampered if mining companies content themselves with conditions unattractive to high-class workmen. If they fail to maintain competitive standards they will find their payrolls and communities overcrowded with inefficient labor which cannot make the grade elsewhere.

As to labor relations in general, the end of the war has dropped the nation into a stew of labor problems of enormous size and unpleasantness. Wages, working conditions, union contracts, the no-strike pledge, the Little Steel formula, maintenance of membership—all the whole body of labor policy, as it has been painfully hammered out in wartime—is in for a thorough, possibly violent, working over. By labor-management conferences on a nation-wide scale, the President hopes to avoid a series of costly strikes that could serve no purpose but to delay reconversion.

Although no one can predict the outcome, our feeling is that, just as the nation now is united on the question of international cooperation for peace, so all factions in industry can be united in the effort to create the kind of life we have it within our power to provide. The people wanted international peace with an unmistakable intensity that cowed even the most isolationist politicians. The people also want industrial peace and jobs. Militant labor leaders and managers had better keep that in mind.

Opportunities Ahead

Reviewing the whole reconversion outlook, we think the mining industry can plan for a working future with full confidence that it has a great task and opportunity ahead. Common sense requires that mining must explore, develop, and modernize to be ready for an unprecedented peacetime demand for its output. The extent to which domestic producers participate in this expanded market will depend heavily on their resourcefulness in leaving no stone unturned to increase efficiency.

RUNNING SMOOTHLY. Cananea's 12,000-ton copper concentrator exemplifies the best in modern design, construction, and operation.

New Cananea Operation Now in High Gear

R. H. RAMSEY, Associate Editor

EVER SINCE *E.&M.J.* had a look at Cananea's new porphyry copper mine and mill in the development and construction stage,* our readers have naturally been wondering how it all worked out. For instance, how did the 30-ton trucks stand up on the 8 percent grades? Did that skipway for lowering ore to the crusher work all right? Did the flowsheet have to be changed? What results are they getting in the mill? We can now provide answers to many such questions, thanks to the generosity and cooperation of the management of Cananea Consolidated Copper Co.

*"How Cananea Develops Newest Porphyry Copper," *E.&M.J.*, December, 1944.

The Mine

About 12,000 tons of ore is now being mined and milled daily. As of June 1, 1945, 1,700,000 tons of ore had been mined and 11,400,000 tons of waste removed, which includes preliminary stripping.

The accompanying map shows the mine as it appeared June 1, 1945. Note that development in the north section is considerably ahead of that to the south. This was planned from the beginning to give quick access to ore for the mill. All the waste stripping was done at first on the North Pit to expose ore rapidly. Later on, the South Pit was to be stripped simultaneously with ore mining in the North Pit. The north wall of the pit has about reached its final limit, and ore is coming from benches 6025, 5985, and 5945.

The South Pit

To the south, benches will be cut and carried back as shown for benches 6585 and 6545, waste from which is now being dumped into the canyon around to the west. As the benches are worked down and back it will become easier to haul waste in the other direction, to the east and south. In June stripping in the South Pit was done only intermittently because of lack of serviceable trucks.

Bench 6105 will be left as it is

Data on Mine Operation, June, 1945

CHURN DRILLING

Feet of hole drilled per shift	100
Feet of hole drilled per bit	90
Tons broken per ft. of hole drilled	28-30
Nine Bucyrus-Erie 42-T drills used	

BLASTING

Tons broken per lb. of dynamite	
Medium-hard rock (waste and ore)	4.2
Hard rock (ore)	3.5
Average for all primary blasting	4.05
Apache Powder Co. explosives used	

LOADING

Tons mined per shovel per shift	4,000
Four 4½-cu. yd. Bucyrus-Erie 120-B shovels used	

TRUCKING

Trips per shift per truck	24
Tons per truck per shift	696
Average haul, North Pit ore, ft.	1,100
Average haul, North Pit waste, ft.	2,100
Average haul, South Pit waste, ft.	900
Twenty-five Mack FCSW, 30-ton mine trucks, Cummins HBS-6 engines	

to provide a haulage road for ore from the South Pit until such time as it is brought down even with the North Pit. Thereafter the consolidated pits will be worked as a single unit.

Open Stope Troublesome

Note the big open stope that appears as a dotted circle on bench 6025. This opening leads into a part of the Colorada mine, which lies directly under the new pit. It will be recalled that the Cananea pit opens an aureole of low-grade copper ore surrounding a core of high-grade ore. This open stope, from which the high-grade ore was drawn, existed at the heart of the new pit like the hole in a cored apple.

When mining in the pit had been brought to within 150 ft. of the back of the old stope, long holes were drilled down to it and the intervening rock was blasted into the stope. This was done to avoid any possibility of a disastrous cave-in later on.

Presence of this opening now complicates mining because a good deal of the ore blasted has fallen into the stope out of reach. When mining is carried to bench 5945 and lower, all this ore will, of course, be recovered quite easily.

Drilling Is Faster

Brief data on the mine at Cananea appear in an accompanying table, but each operation is worthy of some further comment. For instance, drilling has been speeded up considerably from the 67 ft. of hole per shift reported in December. The Bucyrus-Erie 42-T drills now put down an average of 100 ft. of 9-in. hole per shift. Using 29-T drills, 70 to 75 ft. per shift has been reported from some other Southwestern copper pits. The excellent performance is believed due to improved equipment, to increased skill of operators, and to use of a simple incentive wage plan for each driller and helper.

One sample is taken from each drill hole and is assayed and reported before each blast. A map of each blast is prepared beforehand, showing ore and waste, and suitable markers are set up by instrument before and after each blast.

Blasting Unchanged

Blasting practice is about as it was. Holes are deck-loaded with about 4½ cases of powder at the bottom, 1½ to 2 placed about 10 ft. higher in the hole, and ½ case placed if necessary in a final deck 16 to 18 ft. down from the top of the hole. Sand stemming is used.

Free-running powder is used in the weaker overburden to get the

CLEAN HANDLING of material is evident in the Cananea pit, shown just before a blast. Note clean toe of bench onto which rock will be blown above shovel in center. Skipway and finished wall of North Pit are at right.

heaving action that is all this rock requires. In the harder ore, the higher-speed dynamite gives the necessary shattering effect. Even so, considerable secondary blasting must be done.

Shovels Work Better

Shovel output has been stepped up to 4,000 tons per shovel per shift from the 3,700 tons reported previously. This has been done despite the blocky nature of the broken rock, little of which is easy digging. The shovels load on about 80 percent of their time, minor repairs and moving occupying the other 20 percent. Three shovels now mine ore in the North Pit end. One shovel strips waste in the South Pit.

The increase in shovel performance is due to increased skill with equipment, although the thought given to routing and handling of trucks also plays a large part. Each shovel is serviced by four to six trucks, depending on length of haul, and by one bulldozer, which is beautifully effective in slipping in behind each departing truck to clean up spills and pile loose rock for easier digging. As the bulldozer backs out again, an empty truck backs in, just before the shovel swings around from the full truck. Digging is practically continuous. Each shovel, with attendant bulldozer and fleet of trucks, is operated under a simple incentive wage plan.

Cleaning up the toe of each bench before the next blast is particularly well done at Cananea. Looking down from the bench on which the loading crew is at work, one sees a floor as clean as though it had been swept, as indeed it has, with a bulldozer for a broom.

Truck Trouble

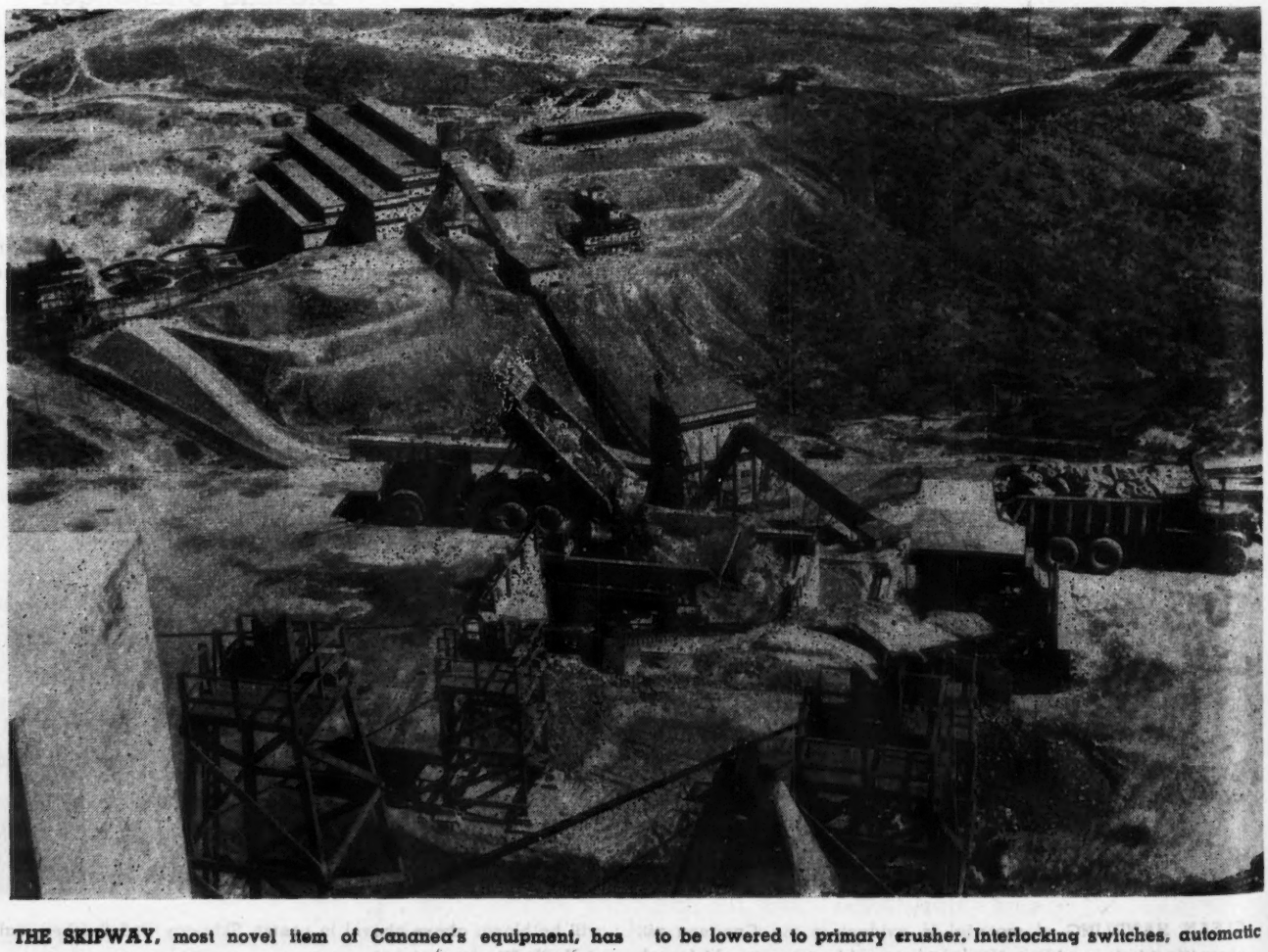
Trucking has been the bottleneck thus far in the Cananea pit, solely because of motor trouble. The service was too severe for the motors originally installed in the trucks, and the result was that of the twenty-five 30-ton Macks, only 8 to 10 were usually in working order. Normal expectation would be that 15 to 20 trucks out of 25 would be operating at any one time, but most of the trucks have been in the shop with motor trouble instead of out in the pit. The resulting concentration on motor repairs caused neglect of chassis maintenance, which in turn caused more troublesome delays. This shortage of trucks has considerably complicated mining ore and has greatly curtailed stripping in the South Pit.

At present the original motors are being replaced by Cummins HBS-6 (supercharged) 150-hp. full-diesel engines. Performance figures on these engines are not yet available. Other data on the trucks are given in an accompanying table. Although the trucks are rated at 30 tons, the average load is about 29 tons, which reduces spillage and avoids breakage due to overloading.

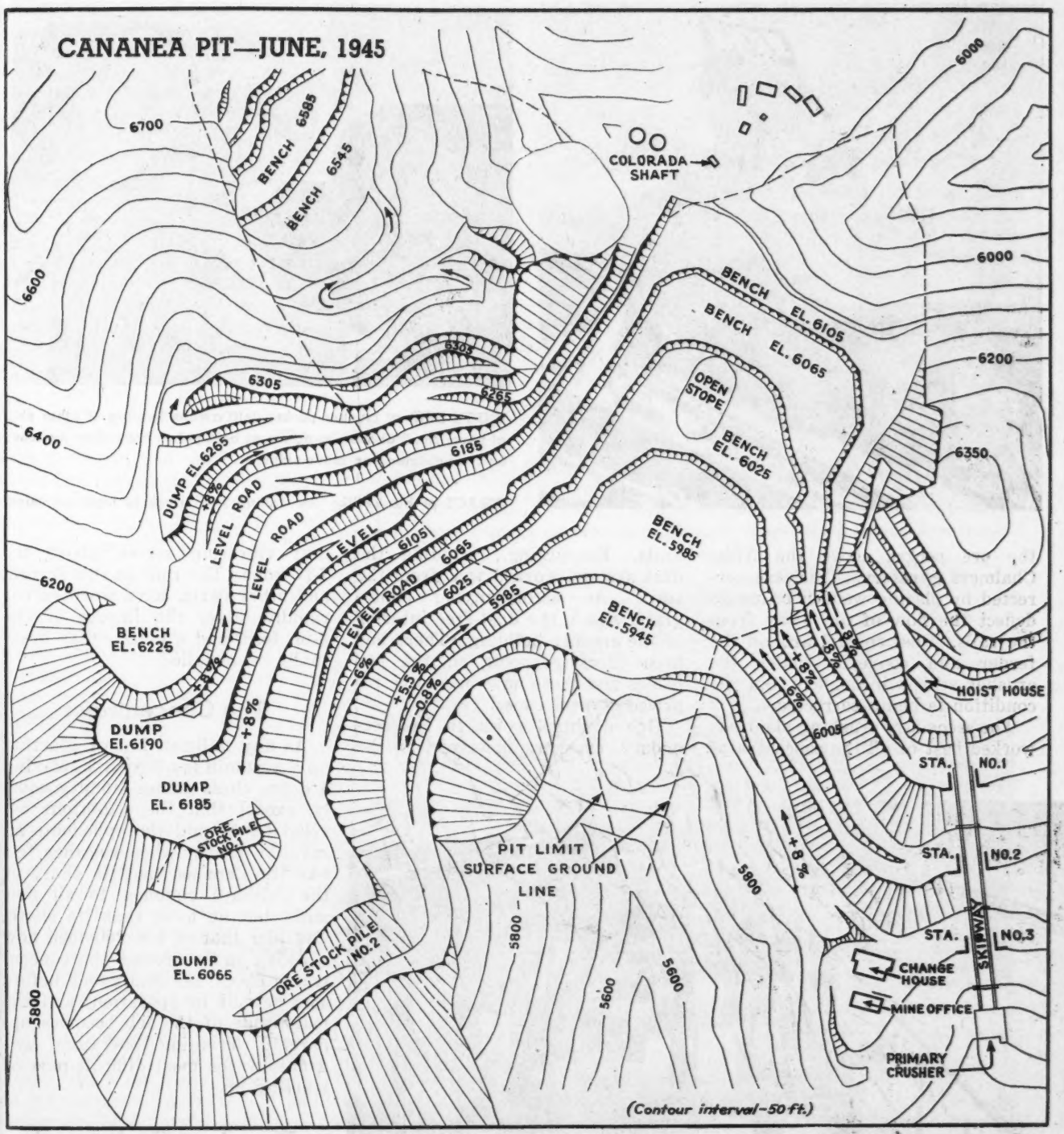
All haulage roads are carefully maintained by sprinklers and by road graders. Men patrol the roads on the watch for loose rocks and nails.

The Skipway

Operation of the skipway, something new to metal mining, has been satisfactory. It was impossi-



THE SKIPWAY, most novel item of Cananea's equipment, has worked well. A 30-ton load is dumped at left into a 40-ton skip to be lowered to primary crusher. Interlocking switches, automatic brakes safeguard operation. Capacity is 1,080 tons hourly.



COMPARE this map with that on p. 79, E.&M.J., Dec., 1944, to see a year's development. Stope referred to in text opens on bench 6025. Much work remains in South Pit (left), but upper wall of North Pit (right) has been established.

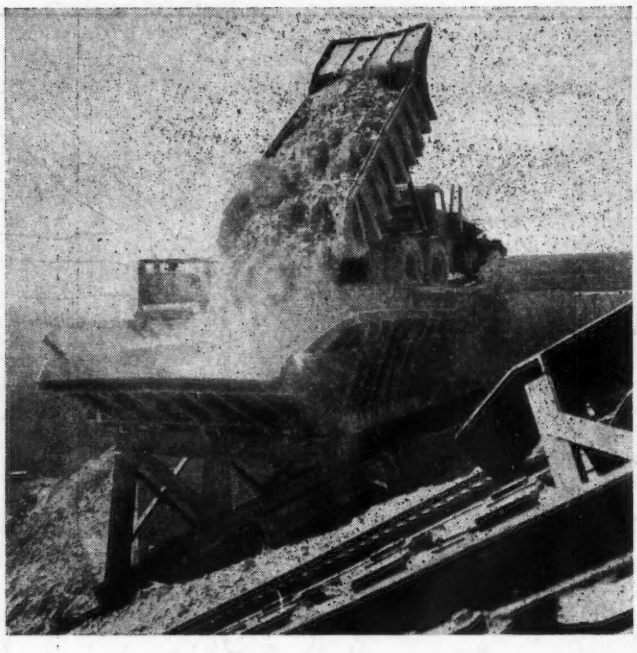
ble, however, to foresee the effects of dumping the heavy blocks of material into the skip bodies until operations had started. When these effects were ascertained, the skip bodies were reinforced by welding heavy angle irons, pointed side up, along the bottoms inside, by putting I-beams under the bottoms, and by reinforcing the hinges and the sideboards. The sideboards were also raised somewhat and the height of the loading platforms was cut down to shorten the fall of rock.

At the crusher house, the skip-dumping mechanism works very well, although considerable trouble was met for the first few months because of filings and chips plugging the hydraulic lines and from other causes, including electrical. Accompanying photographs show the skipway in operation.

At first, Station No. 1 (see mine map) was used; then as the mine was worked down, Station No. 2 was used. This will be the dumping point for another month or so; then No. 3 will come into play. The original 2¾-in. cable is still in use, having lowered 1,700,000 tons as of June 1. Power is generated as the skipway operates (25,000 kw.h. in the month of February), and most of it is used in and around the mine.

Crushing Plants

The primary crusher has operated well, the only difficulty met being a loosening of the rails lining



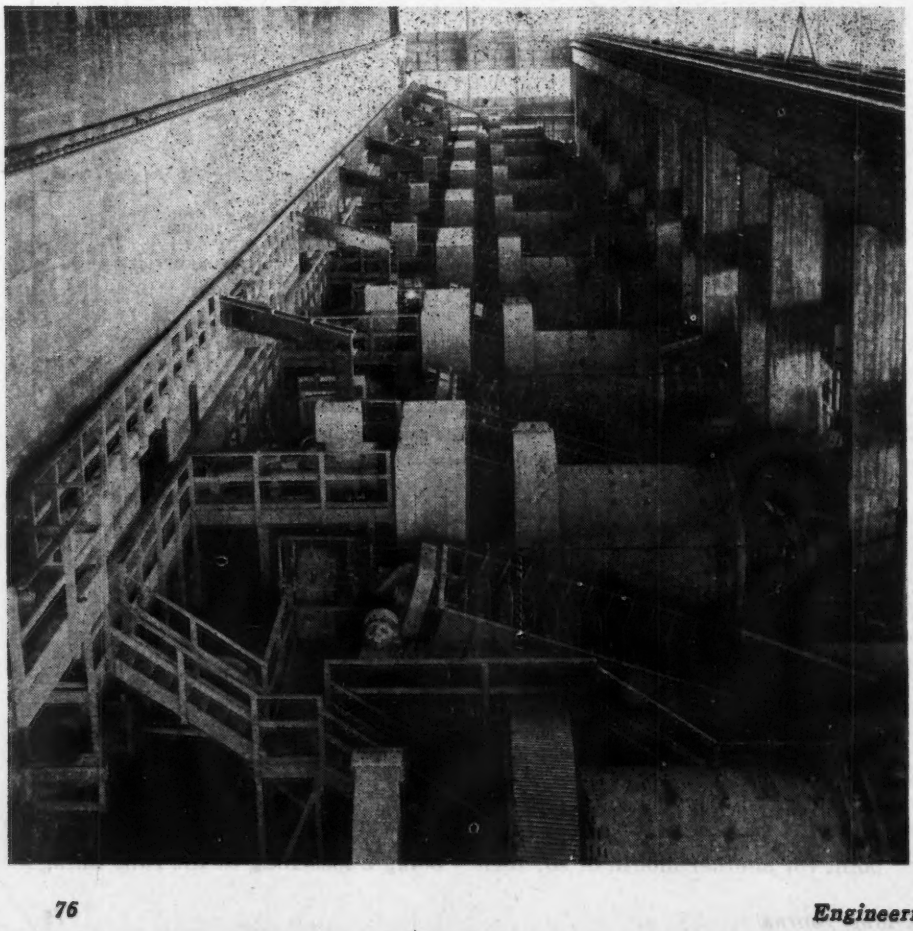
EMPTY SKIP at crusher pocket (left) awaits loading of other skip at Level No. 2 above. Operators at both points must close switches before hoistman can move skips.

IMPACT of blocks like one falling from truck is hard on skips.

the ore pocket above the Allis-Chalmers gyratory. This was corrected by placing wooden beams to deflect the flow of ore away from the rails. Dust control around the feeder and conveyor under the crusher still is incomplete, but the condition is being corrected.

The secondary crushing plant has worked best of all the concentrator units. Everything, including the dust system, worked well from the start. An accompanying photograph shows the dust-free interior of the crusher building. There has been excessive wear on the fan blades and these have had to be replaced several times.

One doubtful point in the secondary crusher, however, is the first vibrating screen above the 7-ft. cone. The rods in this screen, and other parts, have worn rather rapidly under the impact of the 6-in. feed, and a grizzly may eventually be installed.



BALL-MILL FLOOR is well planned for easy operation and maintenance. Spare mill in foreground. Mill and classifier controls show at head of each unit. Balls are added via chutes at left.

The Concentrator

As any millman knows, starting up a new mill is a little like playing a dozen chess games simultaneously, except that the situations develop faster and the opponents all move at once or whenever they feel like it. Cananea had its share of the mishaps common to all new mills, but no more than its share. Consider that of the 200 men now working in or around the concentrator about 180 had never before seen a mill in operation, and the magnitude of the job becomes apparent. Training operators was definitely the most difficult part of starting up.

Flowsheet Unchanged

The flowsheet is still the same as the one laid out before construction began. During a time when it was necessary to operate without middlings thickeners (described later), the flowsheet was altered to resemble more nearly that used at Morenci; but when the thickeners were restored, the original flow-

sheet went back in. Reagent use is about as planned, but grinding is considerably coarser than was intended at first.

It was originally planned to grind the ore to 75 percent minus-200 mesh in an attempt to get maximum recovery, but at few times since the mill started has this fineness been attained. At present, the grind is running around 15 to 17 percent on 65 mesh, much coarser than anticipated, yet the tails are running only 0.11 to 0.15 percent copper. The lowest tailing attained in the test work when running locked tests was 0.08 percent.

The chief difficulty in the way of a finer grind is that the tailing is not thickening well. It had been hoped to get a discharged tailing of 45 percent solids, but about 40 percent is the best thus far reached. This, of course, cuts down mill capacity, and only with the coarser grind can acceptable tonnage be maintained.

However, with the better ore now coming from the pit, the thickening action seems to be improving, and if it becomes possible, a finer grind may be tried. An economic balance between grinding cost and recovery could then be struck.

The Grinding Circuit

Few changes have been made in the grinding circuit and little trouble has been met there. It is interesting to note that the Akins classifiers are set in on a slope of 4 in. per foot, which was done to permit closing the grinding circuit without use of elevating devices. Although this slope is considerably steeper than usual, the classifiers have operated well. Even during a period of low tonnage when the grind was set at 2 or 3 percent on 65 mesh, the steep slope caused no trouble. Incidentally, the effect on recovery of this finer grind was masked at the time because the flotation operators were still inexperienced.

Balls used in the 10x10-ft. Marcys are 3-in. forged steel. One-inch balls are used in the Allis-Chalmers regrind mills. Total ball consumption in both primary and regrind mills has been running about 1.4 lb. per ton.

Ball handling in the mill is easy. Trucks dump balls into outside bins; the ball man reclaims them with an electro-magnet and loads them, 1,000 kilos at a time, into his little car. Climbing aboard his motor, he trundles the ball car down the line to the needy mill. He spots the car in front of the hopper, lifts the gate, and the balls rattle down.

ROUGHER CONCENTRATES, made in these 66-in. Fagergrens, are reground (if primary), or cleaned before regrinding (if secondary). Reground concentrate is recleaned separately.

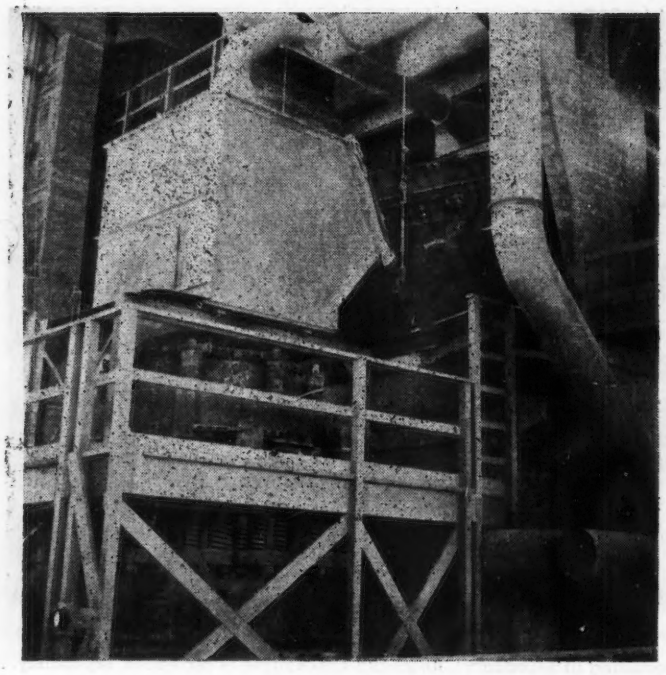
OPERATING CONTROL for flotation is aided by several assay boards, which show results of slop coppers run on hourly mill samples. This board is on rougher flotation floor.

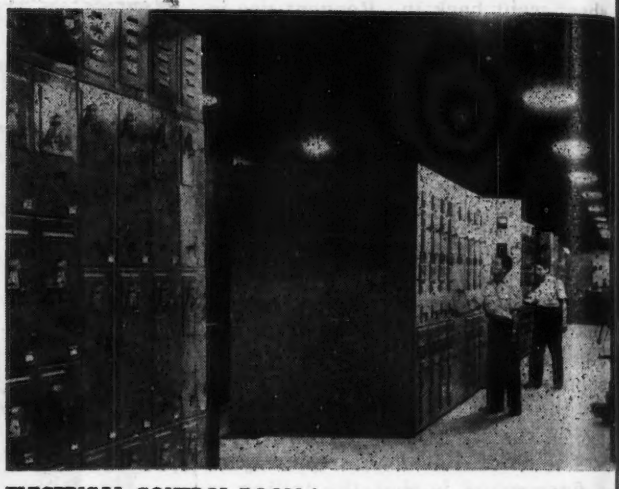
Controls for each mill and its classifiers, including an ammeter for the mill and a rhesotat to control ball mill feed, are placed at the head of each mill. The operators had difficulty at first in adjusting the mill feed properly, because they invariably swung the rheostat too far each way, but they now have the feel of it. Pulp density samples and lime titrations are used freely.

The Flotation

The aim in the Cananea mill is to pull the rougher cells quite hard after the first concentrate has been taken off. To depress all the iron at this point is not attempted. In the cleaning, regrind, and recleaning circuits, lime is run up to nearly a maximum and as much iron as is necessary is dropped there. About 9 to 11 lb. of lime per ton of ore is now used. The company maintains its own lime preparation plant at the rear of the mill building.

Grade of the final concentrate is adjusted by addition of lime, because iron is the only other factor affecting the grade. The insoluble content of the concentrate usually runs 4 or 5 percent and is not a factor. A very high-grade concentrate could be, and has been, secured, but the smelter is satisfied with a 26 percent copper concen-





ELECTRICAL CONTROL ROOM for concentrator is under ball mill floor where panels and gear are accessible, yet out of the way.

SECONDARY CRUSHER, a 7-ft. Symons, was handling 1,000 tons an hour when this picture was taken, which demonstrates effectiveness of dust-collecting system. Similar dust-free conditions were observed throughout the various buildings, with but one exception.

trate, and no attempt is made at present to better that figure.

A feature of the Cananea flowsheet that seems to have yielded the benefit sought is the practice of thickening middlings and then returning them to the regrind mills instead of to the classifiers, or instead of refloating a part of the middlings without regrinding. The Cananea practice is believed beneficial in that it insures that no locked particles will escape at least one pass through the mills, however fine they may be. For a complete flowsheet and list of equipment, see *E.&M.J.*, December, 1944.

Thickener Troubles

This is as good a place as any to mention that no trouble was caused anywhere on the job by the reinforced-concrete construction except in the thickeners. The concrete floors of the big tailings thickeners were damaged due to seepage and were repaired with pumped concrete. Also, a small section of defective concrete in the central pier of one of the middlings thickeners failed and had to be rebuilt. Other than that, all concrete work stood firm.

The peculiar nature of the feed to the middlings thickeners also caused trouble there. It is a heavy material, high in pyrite, and it continually choked the sludge pumps, plugged the sludge lines, and blocked operations generally.

After some study and experiment, three things were done: The middlings return line was changed from 4-in. to 3-in. pipe. Sharp elbows in the line were replaced by sweeping bends. Pulp was evenly distributed across the thickener bottom by cutting holes in the feed launder to allow part of the feed to pour in at intervals between the side of the thickener and the center. This gave a better-mixed sludge, and the result of the three changes has been comparatively trouble-free operation.

Sand pumps are used to return the thickened middling to the regrind mills and the runners of these pumps have an extremely short life. The pumps run at 1,800 rpm., and they are pumping a pulp composed of heavy pyritic copper concentrate at 60 percent solids. These factors, it is believed, contribute to the unusually high rate of impeller wear.

Tailing Disposal

There has been no difficulty with the tailing pond. The dam that impounds the tailing five miles from the mill has not leaked, despite the sizable lake that has built up behind it. The tailing flows readily down the natural channel and spreads evenly when it reaches the lake.

At the point where overflow from the two tailing thickeners is joined to be pumped back to the mill, a small feeder resembling a copper sulphate displacement feeder has been installed. About 30 Nalco balls are added here each day and 30 more are added elsewhere, with the result that lime scale in the mill piping, which threatened to become a problem at one time, is prevented.

Conclusion

Before ending this latest chapter in the continuing story of Cananea's mining activities, I'd like to mention a few of the pictures I carried away in my mind.

There was the way the drivers whip the empty trucks around into place beside each shovel, just like a Saturday shopper diving into a U-turn to get a parking place across the street. There was the ant-heap confusion of loading holes, with men slitting cartridges, stringing Primacord, shoveling sand, shouting cheerful blasphemies at one another, and the whole thing suddenly resolving into a neatly loaded bench waiting, quiet and empty, for the blast.

There was the smooth, rapid flow of crushed ore on the mill bin conveyor belt, a thousand tons an hour riding along as quietly and powerfully as water slipping down a flume. There were the long, flat lines of blue light shining at night from the mill windows and reflected waveringly in the big thickeners.

These tokens of smooth coordination blend, however, into realization that they are the product of a highly skilled management, whose fundamental philosophy it is that machines are no more than the servants of men. Only against the background of this belief can a management arouse among its employees the sort of cooperation I saw in action at Cananea.

New Diesel Hauls Ore At Idarado Property

RECENT TESTS DEMONSTRATED that the 4.5-ton diesel locomotive put into use at the Treasury Tunnel of the Idarado Mining Co. near Ouray, Colo., can push 21 empty Granby-type cars weighing two tons over a 11,900-ft. run against grades shown in the accompanying profile in 20 minutes, and bring out 18 loaded cars each carrying three tons of ore. On other runs the locomotive pushed 15 empty cars to the loading face in 15 min. and brought out 15 loaded cars in the same time.

The locomotive, which was designed by J. P. Ruth and built by the Ruth Co. of Denver, Colo., has a draw-bar pull of 3,000 lb. and is equipped with Westinghouse Bendix brakes.

Compression developed by keeping the engine in third speed is sufficient to hold the loaded train to about 10 miles per hr. on the down grade. A special sander operated with compressed air sands the tracks on a 1,000-ft. stretch of approximately 1.5 percent grade.

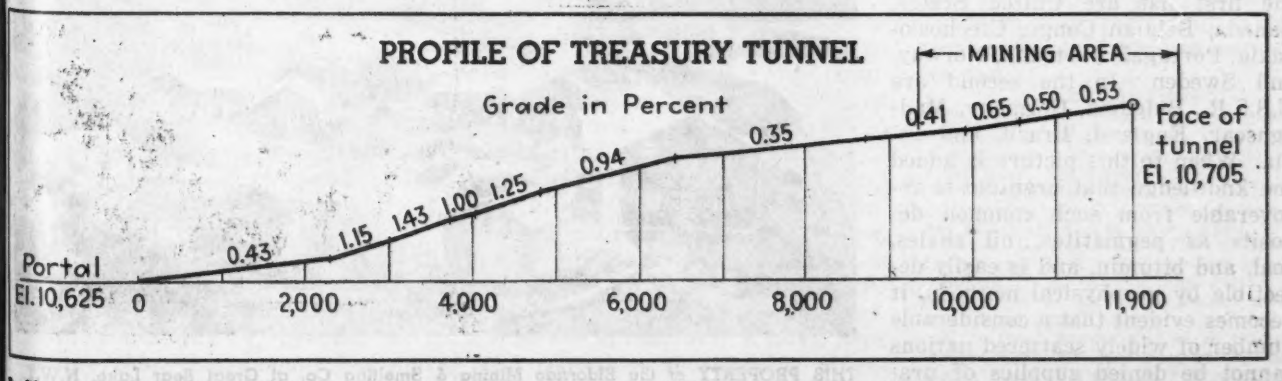
Adequate circulation is maintained by a ventilating fan and booster fan which exhaust air from the face of the dead-end tunnel through 20-in. metal pipe. The locomotive is equipped with an exhaust gas conditioner and is approved for operations in Colorado where an lineal air velocity of 100 ft. per min. has been specified by the Commission of Mines. Each installation in the state must receive specific approval.

Diesel locomotive is equipped with an exhaust conditioner which neutralizes injurious and offensive properties of the gas, permits the engine to idle in one spot without fouling the air

Low Fuel Consumption

Fuel oil consumption totaled four gal. to bring out 180 tons of ore from a point 11,900 ft. from the portal. At 9c per gal. the approximate fuel cost is 0.2c per ton, or 0.08c per ton mile. Six quarts of lubricating oil are required every two weeks.

Equipment on the locomotive includes a tachometer, air compressor, air horn, two air application brake valves (one for forward, and one for reverse operation), a reducing valve to trim the pressure for a particular load being handled, two sealed beam headlights, rolled steel tires, and automatic brakes with sufficient area to stop a 20-ton truck. The side-rod drive operates satisfactorily and is not affected by 6-in. of water which covers the tracks in some places.



Profile of Treasury Tunnel showing grades over which empty and loaded cars must be hauled by the 4.5-ton diesel locomotive

Uranium Supply Will Be Difficult to Control

Uranium is so widespread and abundant that we cannot depend on its scarcity to forestall the possibility of appalling destruction. It will be impossible to prevent a number of nations from obtaining it without our securing either their voluntary compliance or policing their internal activities.

IT WILL SURPRISE MOST of our readers to learn that uranium is not a rare element, but is estimated to constitute 0.008 percent of the earth's crust. It is the 25th element in order of abundance, standing next to copper, and exceeding tungsten. It is twice as abundant as zinc, and four times as plentiful as lead. It is many times more common than tin, silver, or gold.

Uranium occurs in amounts detectible by the spectrograph and Geiger-Müller counter in most granite and sedimentary rocks. In general, shales contain more uranium than sandstones, and sandstones more than limestones.

Sources Are Widespread

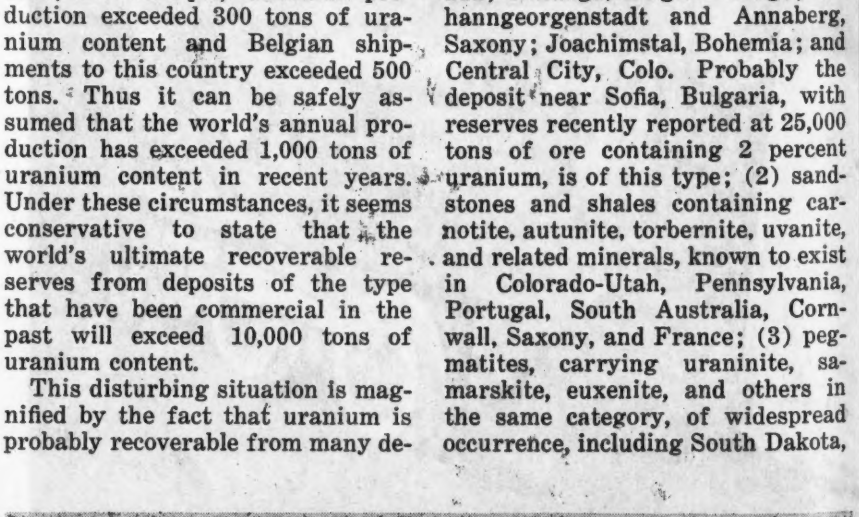
The sources from which it is known to be recoverable by established methods are not as impressive as its general abundance. However, they are so widespread that at least eight countries have accounted for commercial production, and at least seven more have either done, or can probably do, so. In the first list are United States, Canada, Belgian Congo, Czechoslovakia, Portugal, Australia, Norway, and Sweden. In the second are U.S.S.R., Bulgaria, Germany, Madagascar, England, Brazil, and India. When to this picture is added the knowledge that uranium is recoverable from such common deposits as pegmatites, oil shales, coal, and bitumin, and is easily detectible by geophysical methods, it becomes evident that a considerable number of widely scattered nations cannot be denied supplies of uranium adequate for destructive purposes except by a thorough and systematic surveillance which polices both their external and internal activities.

Even in past commerce, uranium has not been a scarce material. In 1939, for example, Canadian production exceeded 300 tons of uranium content and Belgian shipments to this country exceeded 500 tons. Thus it can be safely assumed that the world's annual production has exceeded 1,000 tons of uranium content in recent years. Under these circumstances, it seems conservative to state that the world's ultimate recoverable reserves from deposits of the type that have been commercial in the past will exceed 10,000 tons of uranium content.

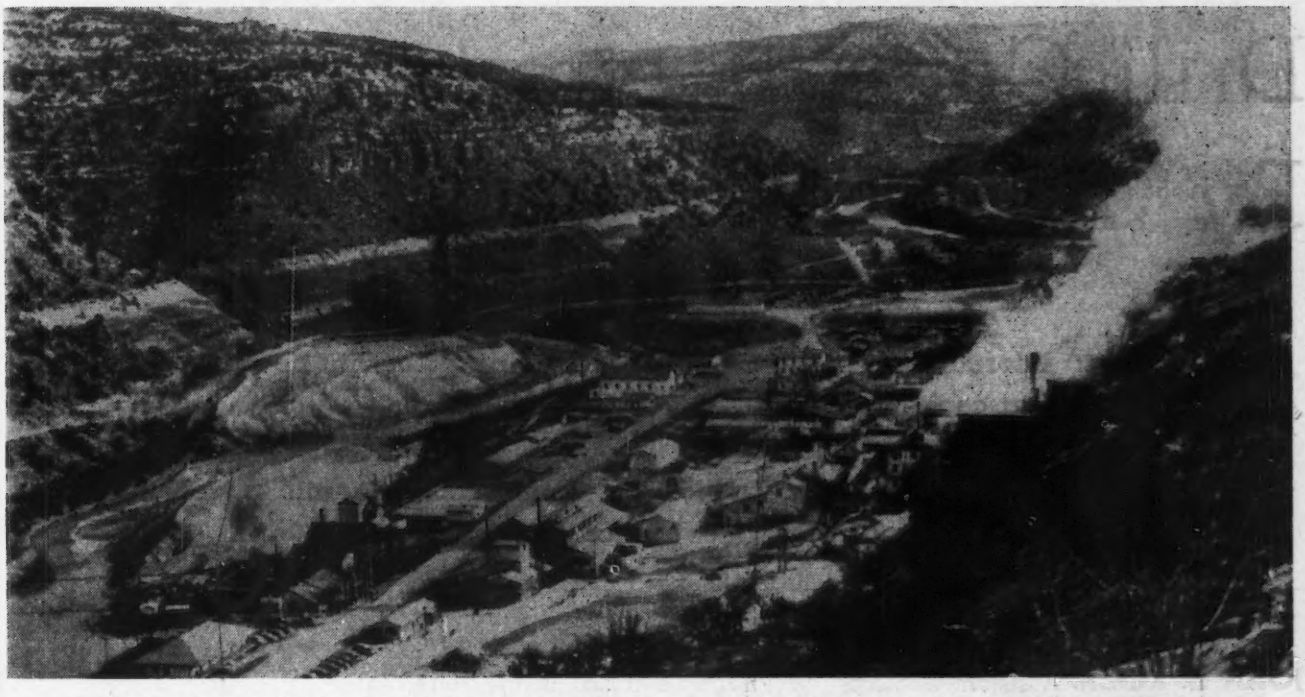
This disturbing situation is magnified by the fact that uranium is probably recoverable from many deposits of coal, shale, bitumin, and pegmatite whose potentialities are unsuspected. Commercially, it has been mainly a byproduct of radium or vanadium production, selling around $1.50 per pound of salts. It is impossible to predict what productive possibilities may exist now that uranium commands extraordinary attention in its own right, at any price.

Three Types of Deposits

Commercial production of uranium has come essentially from three types of deposits in the past, viz.: (1) veins carrying uraninite, such as occur at Great Bear Lake and Contact Lake, N. W. T., Canada; Katanga, Belgian Congo; Johanngeorgenstadt and Annaberg, Saxony; Joachimstal, Bohemia; and Central City, Colo. Probably the deposit near Sofia, Bulgaria, with reserves recently reported at 25,000 tons of ore containing 2 percent uranium, is of this type; (2) sandstones and shales containing carnotite, autunite, torbernite, uvanite, and related minerals, known to exist in Colorado-Utah, Pennsylvania, Portugal, South Australia, Cornwall, Saxony, and France; (3) pegmatites, carrying uraninite, samarskite, euxenite, and others in the same category, of widespread occurrence, including South Dakota,



THIS PROPERTY of the Eldorado Mining & Smelting Co. at Great Bear Lake, N.W.T., Canada, is one of the world's greatest sources of uranium and radium.



URANIUM is associated with vanadium in the ores treated at this plant of the U. S. Vanadium Corporation at Uravan, Colorado

New Mexico, Colorado, Wyoming, Texas, North Carolina, Pennsylvania, New York, New England, Ontario, Quebec, Brazil, Mexico, Madagascar, Norway, Sweden, Greenland, U.S.S.R., India, West Australia, Saxony, Bavaria, South Africa, East Africa, and Japan.

Uranium also occurs in peat in Madagascar, and in coal and oil shale in Sweden.

Belgian Congo Deposit

The richest deposit known is the property of Union Minière du Haut-Katanga, at Katanga, Belgian Congo. This property started production in 1921. By the thirties it had virtually extinguished all competition in radium production except the Canadian producer, with which it divided the market by agreement on the basis Canada, 40: Katanga, 60. The cartel was dissolved in 1941. The concentrates were shipped to Oolen, Belgium, for refining. When the Germans invaded Belgium, mine production was temporarily embarrassed; however, the company soon started shipping concentrates to this country, which took the total war-time production.

Great Bear Lake

The Great Bear Lake deposit, discovered in 1930, claimed known reserves in 1938 of 60,000 tons of ore containing 1 percent U_3O_8. More than this amount has since been milled, but the mine is now twice as deep and can be presumed to have at least an equal reserve. The mill, employing tabling and flotation, was originally of 75 tons' capacity but was stepped up to 100 tons in 1940. Over-all mill recovery was 73 percent in 1938. The company, Eldorado Mining & Refining, Ltd., was nationalized in January, 1944, but was recently reported to have been restored to private hands under the same name. Refining is done at Port Hope, Ont.

The uraninite-bearing veins of Joachimstal, Bohemia, have been mined for hundreds of years. As late as 1930 our principal imports, 150 tons of salts, were from this source. However, competition from Canada and the Congo so depressed the Bohemian operation that, when Germany annexed Czechoslovakia in 1938, Bohemia was producing only 180 to 190 tons of ore per year.

Colorado-Utah Deposits

The carnotite deposits of western Colorado, eastern Utah, and northeastern Arizona were commercially most important between 1910 and 1920. Production declined during the twenties in the face of reduced radium prices and during the thirties was almost entirely incidental to vanadium production. The ores are carnotite-bearing lenses in Jurassic sediments, the McElmo and LaPlata sandstones. They are spread over a large area and contain a considerable potential reserve. In recent years ores mined carried from 2 to 4 percent U_3O_8. Most of the mines are small and scattered. Ore, except from the larger mines at the plants, is trucked in for treatment. The principal operator is United States Vanadium Corporation, a Union Carbide affiliate, with plants at Uravan (50 tons) and Durango (100 tons), Colo.; also vanadium plants at Rifle (200 tons) and Uravan (250 tons), Colo. Vanadium Corporation of America has a plant at Naturita (85 tons), Colo., and a standby at Monticello, Utah.

The refineries all employ pulverization, acid digestion, and fractional crystallization, after the process worked out by Madame Curie. However, in recent years a process of reduction to metallic uranium by calcium hydride was reported to have been developed.

Peacetime uses have been for coloring glass and pottery brown, yellow, and yellow-green; as a mordant in dyeing, and in photography. Uranium has ferro-alloy applications not in common use because of its cost.

REFERENCES

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Drill Cores Logged By Color Photography

Geologic information contained in diamond-drill cores can be recorded faithfully and conveniently with the aid of color photography. Cumbersome and inadequate methods requiring written logs and the storing of cores are obviated by this graphic technique, which presents for ready reference accurate colored slides of cores for an entire drill hole.

JOHN E. KISER, Assistant Geologist, St. Joseph Lead Co., Bonne Terre, Mo.

COLOR PHOTOGRAPHY is a convenient and effective medium for the recording of geologic information revealed in diamond-drill cores. This recent technique supplants written descriptive logs, which are subject to errors of interpretation, with faithful graphic reproductions of drill cores and exposed minerals in natural colors. The experimental work and final methods here described were prompted by Prof. Charles A. Dobbell's article, "Photography for Improving Drill-Core Records," *E.&M.J.*, April and May, 1944.

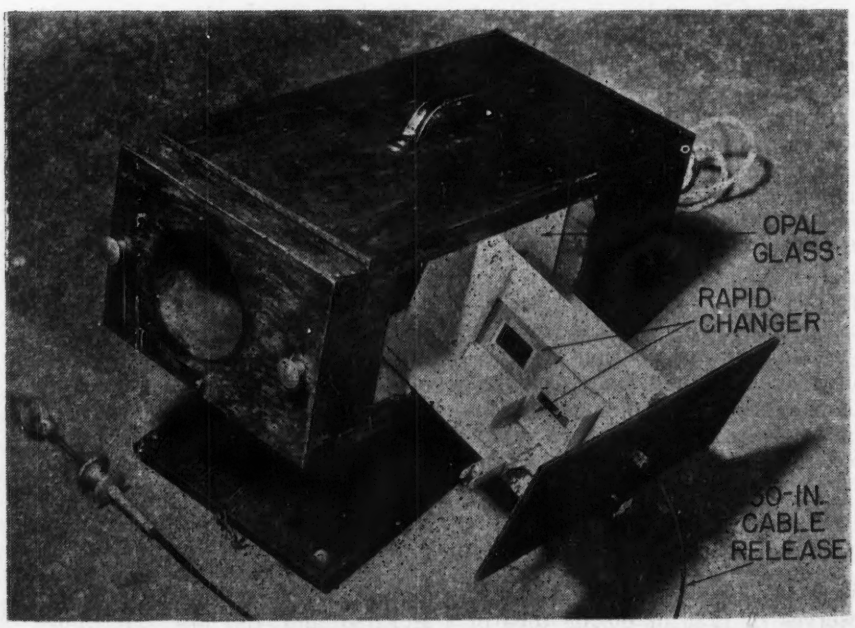
Our practice in keeping core records consists of saving a sample of each bed in the formation and saving all of the mineralized rock. A classification of beds has been worked out for logging the cores. Photographing an occasional sample would, therefore, be no improvement over the present method. It is, however, a great improvement to have a record of the entire thickness of formation, showing all of the changes in that formation.

This can be accomplished by (1) a written description; (2) saving all of the cores; and (3) photographing the entire hole. Written descriptions serve the writer well, but for someone else to visualize exactly what those words mean is quite impossible. Saving all of the cores is, of course, out of the question because of the prohibitive costs and the large amount of storage space required. Photographing the entire hole is far superior to the written record, for anyone may see for himself just what the rock looks like. Storage space is insignificant, and the cost of photographs is much less than that necessary to provide the necessary trays and cabinets for core storage.

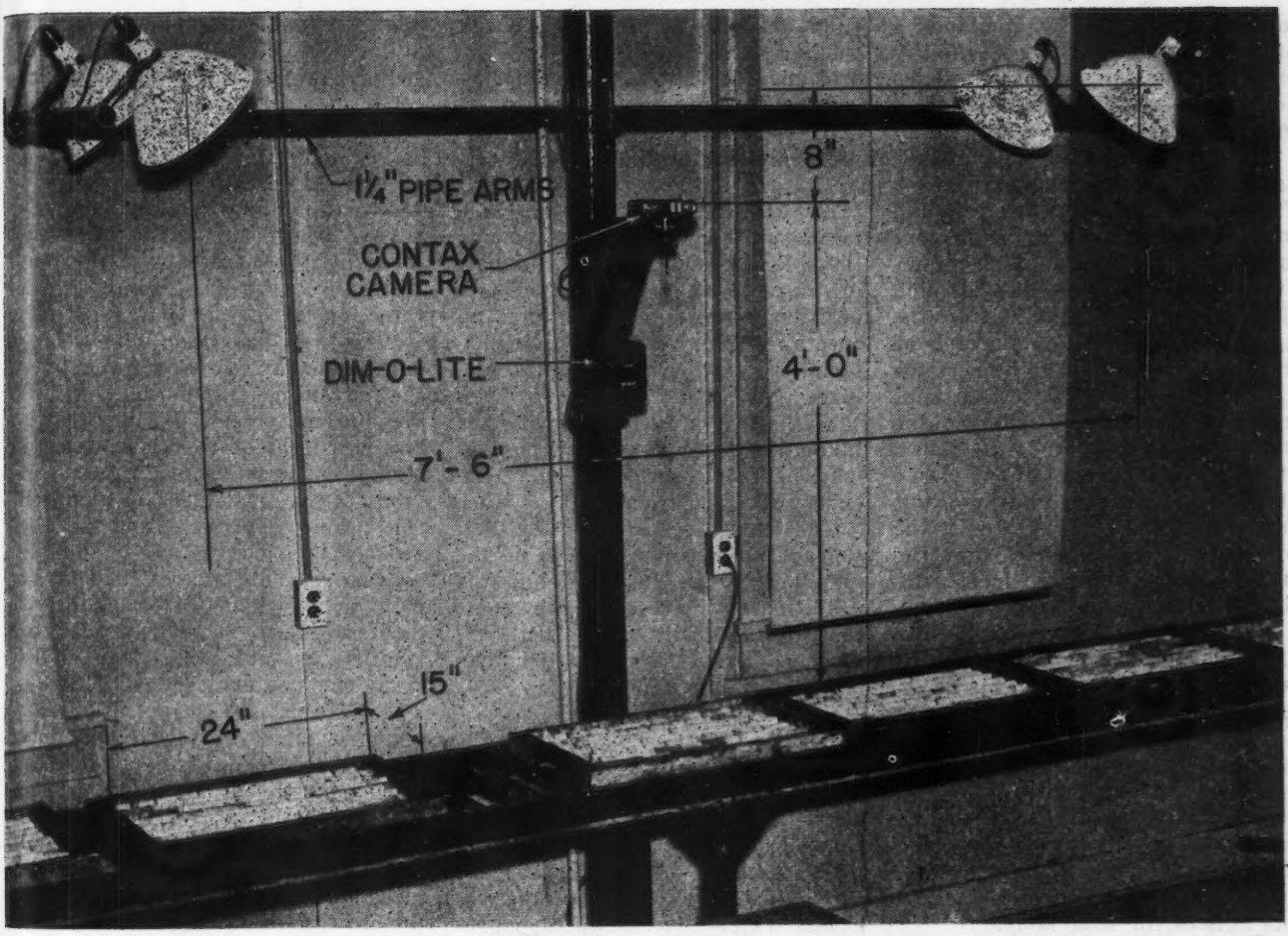
Photographs of cores, to be of any value, must show detail to a fine degree, and as color is such an important property in identification of beds, the photographs must be in color as natural as can be obtained.

Color Is Necessary

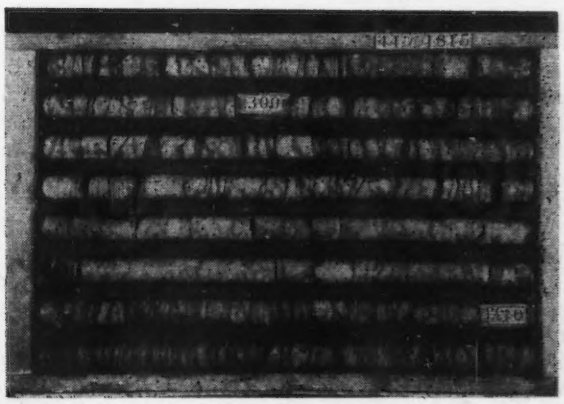
Black-and-white photographs were first made to determine whether or not drill cores were photographic. A 4x5 Laborant enlarger was used with 9x12-cm. portrait panchromatic film. Also 3¼x4¼ super XX sheet film was tried. Cores were photographed both wet and dry, for it has long been a practice to wet cores to bring out contrasts in detail while logging a hole.



THE MAGAZINE of the "rapid changer" can hold 50 colored slides showing contents of trays containing 900 ft. of diamond-drill core.



FOUR PHOTOFLOOD NO. 2 LAMPS in enamel reflectors provide ideal light. Roller conveyor permits easy handling of 15x24-in. core trays.



APPROXIMATE SIZE OF PICTURE in viewer. Much detail is lost in this black-and-white print reproduced from a color transparency.

The photographs of the wetted cores were good, and all of the identifying properties were there—texture, bedding planes, porosity, stylolites, and oölites—all except the most important property—color! Further experiments were, therefore, made with Kodachrome.

At first it was desired to determine what kind and intensity of light would render the best detail and reproduce in the picture the most natural color. A tray of cores was photographed in sunlight with Type B Kodachrome film. Fluorescent lighting was tried, using two banks of four 40-watt tubes. Photo flood bulbs, No. 1, No. 2, and No. 4, were tried at various distances and angles with Type A Kodachrome.

Standardization is impossible in outdoor photographing because a light reading must be taken every time a series of pictures is to be made. Time is limited to only clear days and only certain hours of the day. Wetting the cores outdoors in winter would result in formation of ice on the cores.

Fluorescent lighting gave unnatural color. No. 2 photoflood lights with Type A Kodachrome film gave the best results as to natural color and rendition of detail. All possible daylight must be excluded to obtain the best color.

35-mm. Equipment Used

The camera used at present is the Zeiss Contax II, with the Sonnar F2, 50-mm. lens. However, there are several other makes of 35-mm. cameras with lenses which might be used with good results.

The construction of the Contax case is especially good, as the back may be removed to permit the use of a ground-glass screen in framing and focusing the picture.

The Sonnar F2 lens is adapted

to this use because it combines a high degree of "brilliance" (ability of a lens to give critically sharp definition) with its adaptability to color photography.

Four photoflood No. 2 lamps are used with white-enamel reflectors. The enamel reflectors were found to give approximately 50 percent more light than satin-finish aluminum, with the same number and size lamps. The position of the lights shown in the photograph of the set-up was found to be best for even distribution of light and minimum of direct reflection into the camera lens. Lights must be placed at the end of the cores, for if placed at 90 deg. from this position, light from the cylindrical surfaces of the cores would be reflected into the camera and give white lines along the cores in the pictures.

The Dim-O-Lite prolongs the life of photoflood lamps by making it possible to operate the lights at reduced current while pictures are not being taken. Lamps burn out most often just as the current is switched on. Their life has been lengthened by turning the reduced current through at first, then going to bright. Heat and glare are reduced by using the Dim-O-Lite. It has outlets for four lamps.

The cores are wetted with a tree spray, and any water which stands in beads on the cores or core tray is taken up with a sponge. A few drops of wetting agent in the water gives more uniform wetting on hard and smooth cores.

Technique Is Standardized

At the outset, after the equipment is installed and arranged, the camera and bracket are adjusted until the tray of cores takes up the entire area of the film which will be exposed. This is accomplished by removing the back of the camera and inserting a ground-glass screen. Focusing is done on this screen, and once the range is established, it may be marked on the range scale for future setting. For our size core tray (15x24 in.) the distance from cores to camera is four feet.

Light-meter readings showed the correct settings to be a diaphragm opening of F 5.6 with 1/5-sec. exposure, but experience later proved that about one-third of a stop more light made the density better for the dark-colored cores and did not make the light-colored ones too thin. All pictures are now taken at F 5 and 1/5 sec. After the camera settings and position of camera above the cores are established, these operations need not be repeated. The camera fits into the mount in exactly the same way each time it is replaced after loading.

The routine for taking the pictures is: wetting the cores and taking up the excess water; placing the hole number and depth numbers in proper place; pushing tray to position beneath camera; final inspection for dry spots, foreign material in tray; and taking the picture.

With the proper type of film take-up spool, twenty exposures may be made on the regular 18-exposure Kodachrome roll.

The time necessary for the photographing of cores depends on the number of men employed and the condition of the cores as they come in from the field. After a little experience a four-man crew can take one picture per minute.

Consecutive Procedure

One man places the trays on the conveyor and sprays the cores; another makes up the numbers and places them at proper depths; the third, next to the camera, takes up excess water, touches up dry spots with a brush, and removes foreign material of any kind; and the fourth operates the camera and lights. One hundred and twenty pictures were taken in a two-hour period.

Two general types of equipment may be used in viewing the Kodachrome transparency. Projectors that accommodate the 2x2-in. slide enlarge the pictures to any desired size, even to full scale, without the loss of too much detail. A screen must be used which does not impart grain or texture to the picture. Projecting on a screen must be done in darkness, and for this reason it is an undesirable method of viewing the slides.

By fitting the projector into one end of a box and projecting the picture on a ground glass at the other end, the picture may be viewed on the back side of the ground glass. A darkened room is not necessary. A "rapid changer" is available for Kodaslide projectors which holds as many as fifty slides in a magazine. In most cases, all of the pictures for an entire hole may be placed in a magazine and viewed consecutively without making it necessary to take one slide out before viewing another. Pictures are changed with a finger-operated feed mechanism with a 30-in. flexible cable.

For viewing the geology of the cores an enlargement of 2½ diam. is sufficient. The Leica desk viewer serves well for viewing the slides. It gives an enlargement of about 2½ diam., and the light may be varied by means of a rheostat. More light is necessary behind the pictures of the dark-colored cores than for the lighter ones.

A viewer has been devised for our particular use which combines the advantages of both types of viewing equipment. Built within a box is a light of variable intensity behind a piece of opal glass. In front of the opal glass is mounted the "rapid changer," and in the front of the box is a 4-in. double convex lens. The side of the box, or part upon which the changer is mounted, may be pulled out for loading or unloading the slides from the magazine (see picture). The box may be adjusted at any angle for viewing, and the lens may be adjusted to suit anyone's eyes. The lens is large enough to assure viewing the picture with both eyes. The box is small (7x9x17 in.) and may be carried easily from place to place. It can be used anywhere, in the dark or in daylight, where 110-volt current is available.

As the original cost of the camera and equipment is variable and would be spread over an indefinite number of pictures, it therefore need not be considered. The only operating materials are the No. 2 photoflood lamps and the 35-mm. Kodachrome Type A film. The No. 2 photoflood lamps burn approximately six hours, so the cost may best be figured on this basis.

Four lamps, costing about 30c each, will burn approximately six hours, during which time 360 pictures may be taken. Type A Kodachrome costs approximately $2.40 (developed) for twenty exposures, or $43.20 for 360 pictures. Lamps, plus film, cost $44.40 for 360 pictures, or 12⅓c for each picture of a tray containing 18 ft. of cores.

Value of Method

The limits as to what may be seen in a 35-mm. color picture of this kind must be realized. Mineralization of the rock can be detected, but how much mineralization cannot be estimated. For current and future study of structural and stratographic features of the cores, 35-mm. color film is a fine record.

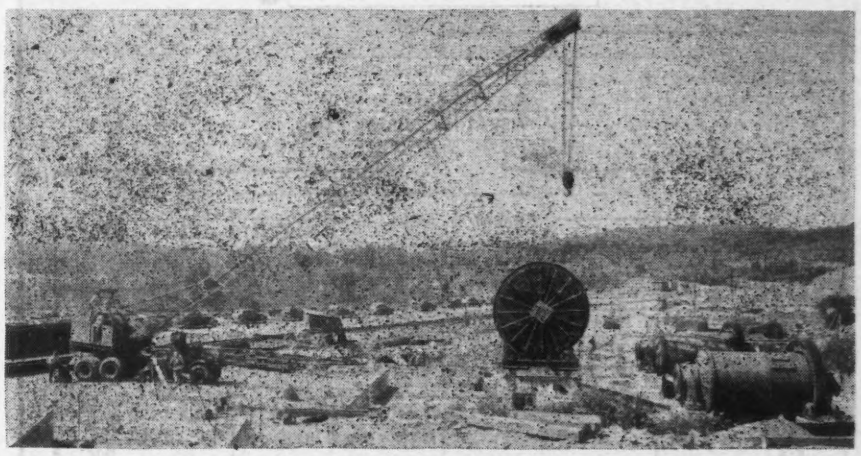
New Magnetic Concentrator Treats Mt. Hope Iron Ore

HARRY DAVENPORT, Superintendent, Mt. Hope Mine of the Warren Foundry & Pipe Corporation, Wharton, N. J.

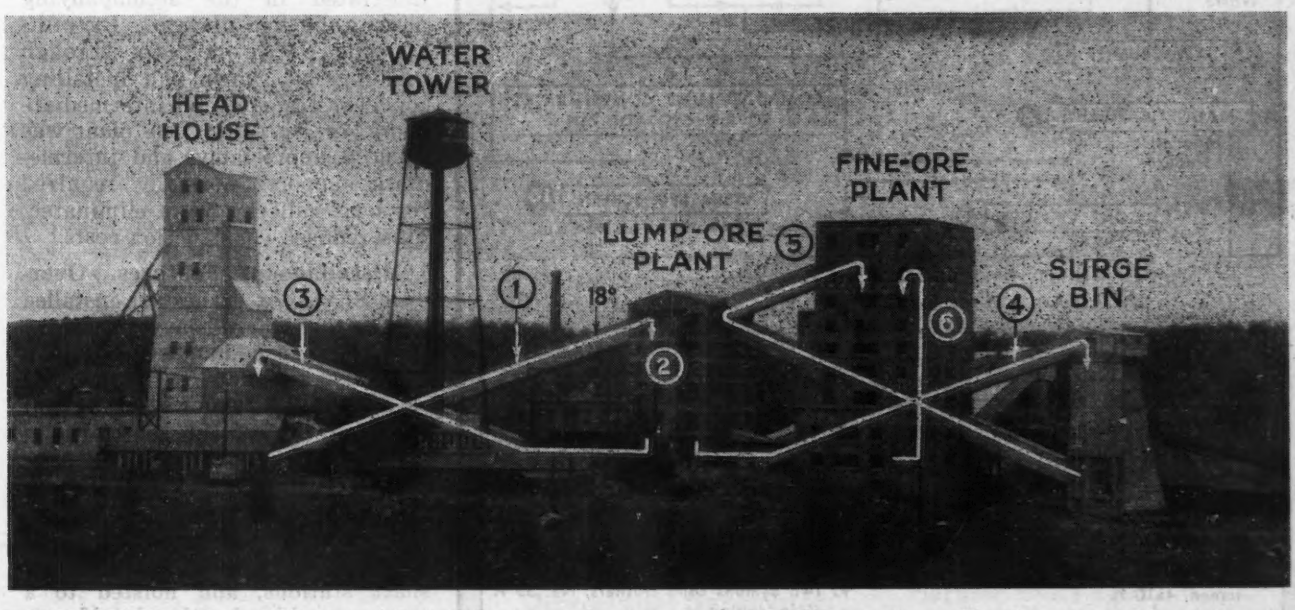
THE RECENTLY COMPLETED magnetic concentrator at the Warren Foundry & Pipe Corporation's Mt. Hope mine, Mt. Hope, N. J., constitutes a major part of the modernization program which was initiated at the property in 1941. With a rated annual capacity of 480,000 tons, the new plant concentrates a lump and fine product, and is equipped with efficient magnetic units coordinated in a flowsheet designed to handle increased mine production and improve grade and recovery.

Other improvements at the property, which is reputed to be the oldest iron mine in the United States, with operations dating back to the second decade of the Eighteenth Century, include the new Leonard shaft sunk to 2,674 ft., a new head house, an 1,800-hp. ore hoist and 900-hp. man hoist, a change house, a compressor house, and a water supply system.

Because high-grade lump magnetite is in continual demand for open-hearth steel furnaces, the new concentrator produces approximately two-thirds of the concentrates in the lump-ore plant, the remainder being produced by wet magnetic concentration in a fine-ore plant. Under present operating conditions the plant operates two 8-hr. shifts



DORRCO FILTERS and rod mills were set on their foundations before the fine-ore plant was constructed. Part of the water reservoir was created from a peat bog shown at left.

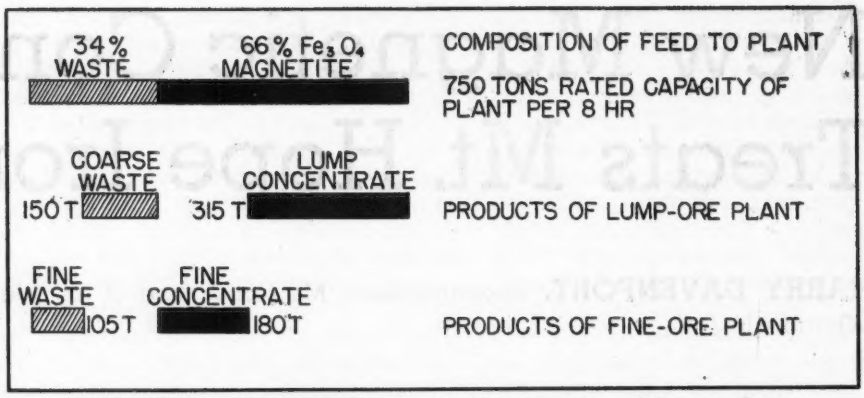


HOW ORE IS ROUTED: (1) Ore from bin in head house is conveyed to lump-ore plant. (2) Lump ore is magnetically separated from waste. (3) Coarse mids are crushed to 2 in. and returned to feed bin. (4) Fine mids and minus-3-mesh screenings are sent to surge bin. (5) Switch-back conveyor supplies feed to fine-ore plant where concentrates, mids, and tailings are produced by wet magnetic separation. (6) Mids are ground by rod mills on lower floor and recirculated through magnetic separators. Concentrates are stored in bins and tailings are sent to piles on the far side of the plant. The 138-ft. water tower feeds the plant.

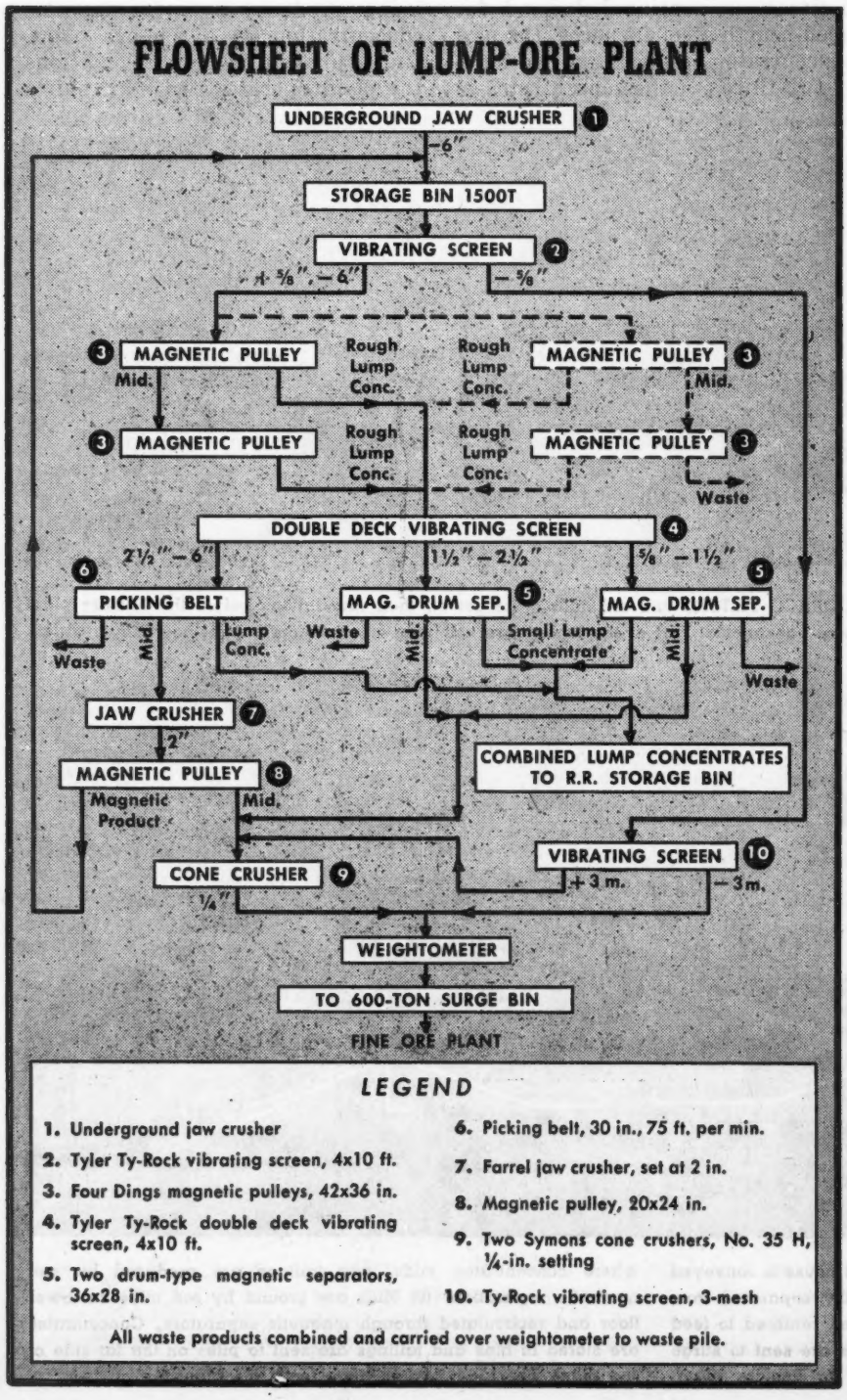
per day, with a rated capacity of approximately 750 tons per shift.

Design of the plant, which was constructed by the J. G. White Engineering Corporation, of New York, incorporates the following notable features:

Fireproof Construction. Concrete, steel, transite sheathing, and concrete block masonry render the plant so completely fireproof that it is unnecessary to carry fire insurance. This is of special significance at Mt. Hope because the new fine-ore plant was rushed into completion in December 1943 to replace a former plant which was destroyed by fire in June 1943. The lump-ore mill was completed in January 1945.



PROPORTION OF MAGNETITE concentrated in lump-ore and fine-ore plants.



LEGEND

1. Underground jaw crusher
2. Tyler Ty-Rock vibrating screen, 4x10 ft.
3. Four Dings magnetic pulleys, 42x36 in.
4. Tyler Ty-Rock double deck vibrating screen, 4x10 ft.
5. Two drum-type magnetic separators, 36x28 in.
6. Picking belt, 30 in., 75 ft. per min.
7. Farrel jaw crusher, set at 2 in.
8. Magnetic pulley, 20x24 in.
9. Two Symons cone crushers, No. 35 H, 1/4-in. setting
10. Ty-Rock vibrating screen, 3-mesh

All waste products combined and carried over weightometer to waste pile.

Gravity Flow. The six-story lump-ore plant, and the eight-story fine-ore plant were designed to permit gravity flow of material, thereby eliminating frequent rehandling or awkward transportation of intermediate products and concentrates. In each plant the crude product enters at the top floor, and the concentrates and waste products are removed to bins or waste piles by separate conveyors projecting from the sides of the lower floors.

Space Conservation. A carefully planned system of conveyor belts and galleries raises the crude and intermediate products to the top floors of the respective plants as illustrated in the accompanying photograph and diagram. By routing the conveyors back through buildings as shown and installing conveyor transfers on intermediate floors, the spread of the plant was reduced appreciably, and intermediate supports normally required for long galleries were eliminated. This reduced construction costs.

Miscellaneous Features. Overhead Shaw-Box cranes are installed on all floors where heavy machinery or parts must be handled. Adequate light is supplied by numerous, closely spaced windows throughout the plant. Raised concrete curbs in the wet mill prevent water or spills from dropping from floor to floor, and aid in keeping the plant clean.

Magnetite ore is reduced to 6 in. by jaw crushers in underground shaft stations, and hoisted to a coarse-ore bin in the headframe which feeds the lump-ore plant. The accompanying chart illustrates the proportion of magnetite concentrated in the lump-ore and fine-ore

plants, respectively, and the waste eliminated in each under current operating conditions. Mill feed averages about 66 percent magnetite or about 47 percent iron. Ratio of concentration for the entire plant is about 1.5 to 1, with lump concentrates averaging 60 to 62 percent Fe, and fine concentrates averaging 67 to 68 percent Fe.

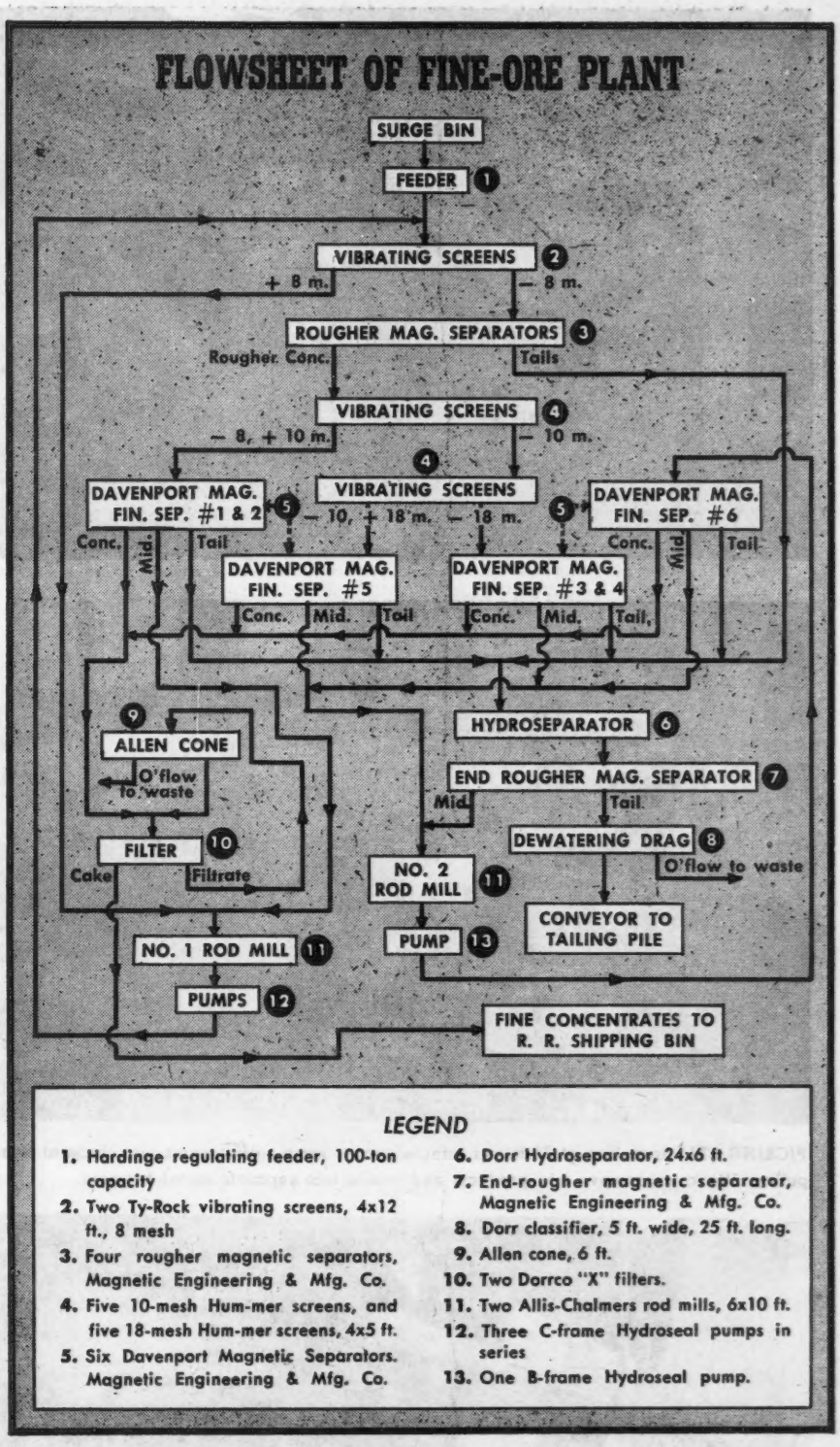
Lump-Ore Plant

Ore from the 1,500-ton storage bin is conveyed to the top of the lump-ore plant, where a crude lump product (plus ⅝, minus 6 in.) is screened free of fines and subjected to rough cobbing over a series of two magnetic drum pulleys. (See flowsheet.) The first pulley selects highly magnetic pieces and rejects a mid, which is recobbed by a second pulley, which produces a rough concentrate and a waste product. Two additional pulleys installed in parallel as indicated by dotted lines are used during alternate 8-hr. shifts. Continuous use of one set of pulleys would generate sufficient heat to impair the efficiency of magnets appreciably. Combined rough concentrates from both pulleys are separated into three sizes by a double-deck vibrating screen. The coarsest size, 2½ to 6 in., is separated into a mid, waste, and lump concentrate on a picking belt. The mid product (locally called half-and-half), after being crushed to 2-in., travels over a magnetic pulley, which produces a magnetic product for recirculation, and a mid, which is crushed to ¼-in.

Two smaller products of the double-deck screen travel over magnetic drums and are separated into mids, waste, and concentrates. All lump concentrates are combined and carried to a railroad storage bin by a conveyor, and all waste products join on a common belt and are conveyed to the waste pile. Small mids, crushed to ¼ in., and minus-3-mesh screenings, are delivered by belt to the 600-ton surge bin.

Fine-Ore Plant

Approximately 1,100 gallons of water per minute is added to the dry feed of the fine-ore plant as it passes over two 8-mesh primary screens on the top floors. Oversize (plus 8 mesh, minus ¼ in.) goes to the No. 1 rod mill, on the ground floor, for grinding and recirculation. Undersize is split four ways and fed to rougher magnetic separators. Rougher tails go to a policeman (end rougher separator) and are discarded. Rougher concentrates are sized by vibrating screens as shown in the accompanying flowsheet and fed to five Davenport finishing separators producing concentrates, mids, and tailings.

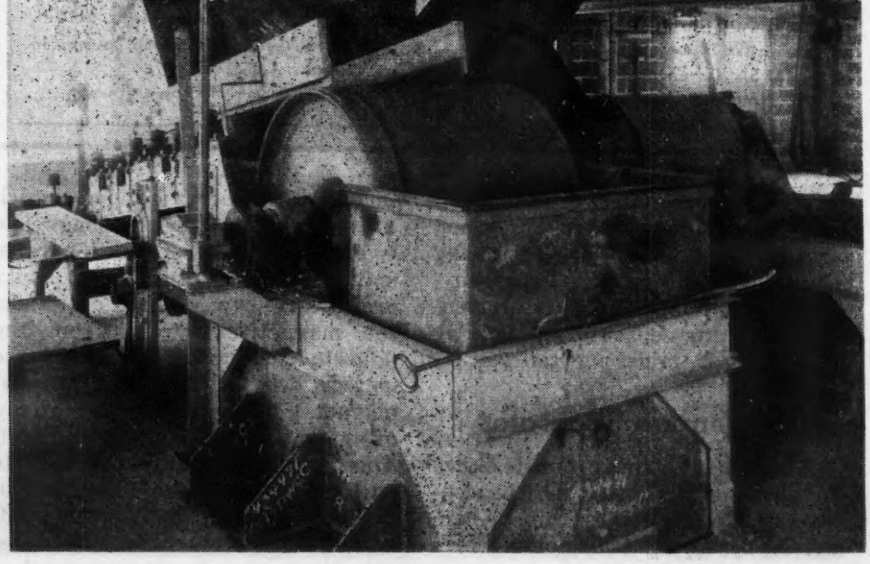


Davenport Separator

The finishing separator, designed by the author of this article, consists of a 54-in. endless rubber belt, driven by a 5-hp. gearmotor over a series of hoppers through which the pulp containing the magnetite is circulated. A series of parallel magnets with alternate polarity overlays the lower belt and attracts the magnetite upward from the pulp to the lower surface of the moving belt. Alternate polarity of magnets causes a continual shifting of magnetic particles on the belt, thus permitting entrapped waste particles to drop out. Differential field strength segregates the products into concentrates and mids,

DOUBLE-DECK VIBRATING SCREEN handling coarse feed to lump-ore plant. Note transfer arrangement in conveyor for routing fine ore from surge bin to top floor of fine-ore plant.

PICKING BELT traveling at 75 ft. per minute carries lump concentrates into chute at head pulley. Workmen remove mid products and waste into separate metal hoppers.



SECOND MAGNETIC DRUM in a series which feeds lump products to picking belt on floor below.

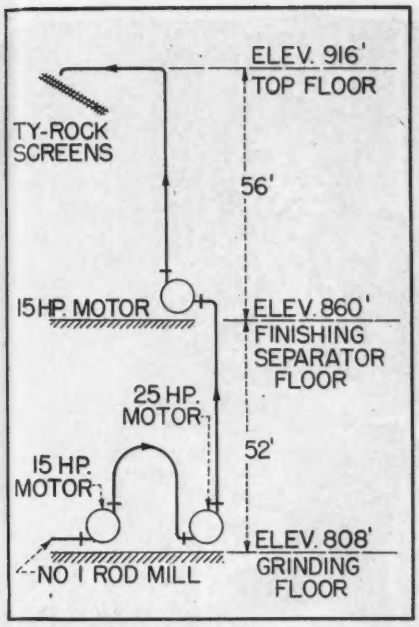
which drop out through separate hoppers, and waste, which is discarded through a third. Efficient operation of the separator depends largely on careful sizing of the feed. That is why feed is screen-sized to minus 18 mesh, minus 10 plus 18 mesh, and minus 8 plus 10 mesh.

Concentrates from the six finishing separators are delivered sufficiently free of water to go directly to a filter instead of through a dewatering cone. Mids are reground in rod mills and recirculated for treatment; and tails are combined in a hydroseparator and passed through a scavenger separator, which recovers a mid product before the tails are dewatered and discarded by belt to the tailing pile.

The new fine-ore wet process was adopted in preference to the dry process used in the former plant because it reduces the phosphorus content in the concentrates to a minimum, eliminates the dust hazard, and increases efficiency and recovery. When the plant is operated at rated capacity, approximately 3,000 gal. of fresh water is supplied per minute by the 138-ft. water tower and circulated to the various mill units as follows:

	G.p.m.
To TyRock screens with dry feed	1,100
To rougher magnetic separators	300
To Hum-mer screens	250
To finishing separators	1,350
Total	3,000

An additional 800 g.p.m. is recirculated in the discharge from the No. 2 rod mill to the finishing separator floor by a B-frame Hydroseal pump; and approximately 240 g.p.m. in the discharge from the No. 1 rod mill to the primary screen on the top floor by three C-frame Hydroseal pumps in series. At first only two pumps were operated in series on the first floor. Moving one pump 54 ft. higher on the discharge line increased the capacity considerably. Finally, another pump was added on the first floor to relieve the load of the lower pump.



THREE CENTRIFUGAL PUMPS arranged in series gave best results.

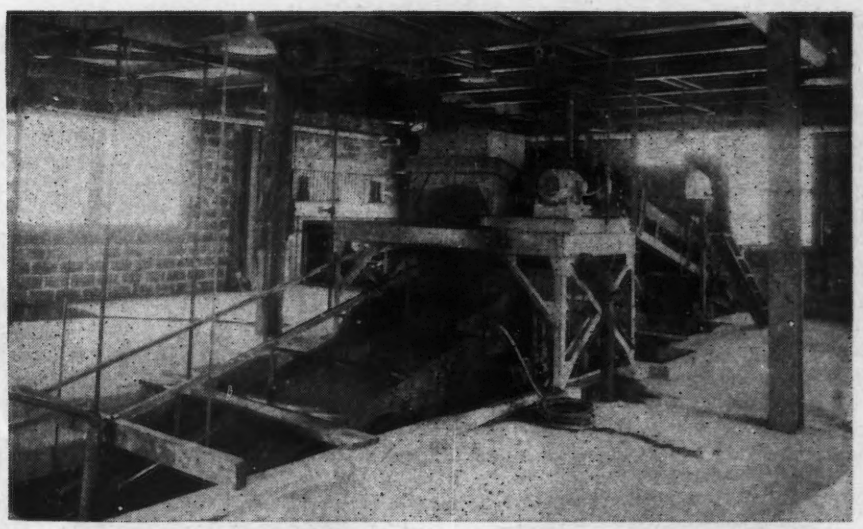
This arrangement is most satisfactory and is illustrated in the accompanying pump diagram. The ratio of water to solids handled by these pumps is approximately three to one by weight.

To insure ample water supply for the plant, a 216-acre reservoir which receives run-off from 1,250 acres was created by constructing an earth dam across the outlet of a peat bog which adjoins the mill. Two 1,500-g.p.m. Pomona pumps powered by 100-hp. motors, and one 3,000-g.p.m. Pomona pump powered by a 200-hp. motor supply clear water to the 138-ft. water tower, which feeds the plant.

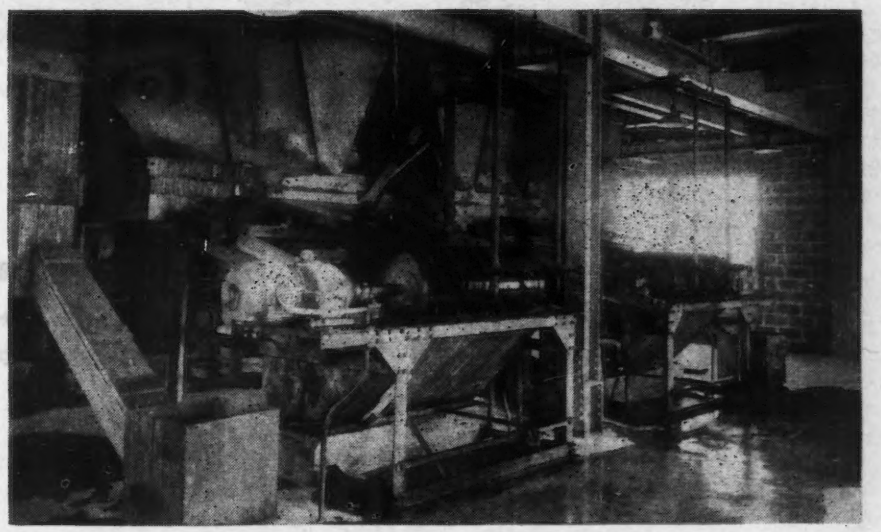
Installed horsepower in the lump-ore plant is 303.5 hp. at 400 volts a.c.; and in the fine-ore plant it is 300 hp. at 2,200 volts a.c., 376 hp. at 440 volts a.c., and 6 hp. at 115 volts d.c. Total power consumption per ton mined and milled is 52.4 kw-h., of which 13.1 kw-h. is required for the concentration of the fine and lump products. Magnetic circuits of the fine-ore plant require 285 amp. at 110 volts, or 33.5 kw.; and those of the lump-ore plant require 150 amp. at 110 volts, or 16.5 kw.

Officers of the Warren Foundry & Pipe Corporation are J. Leonard Replogle, chairman of the board; L. R. Dohm, president; and E. L. Hopler, secretary and treasurer.

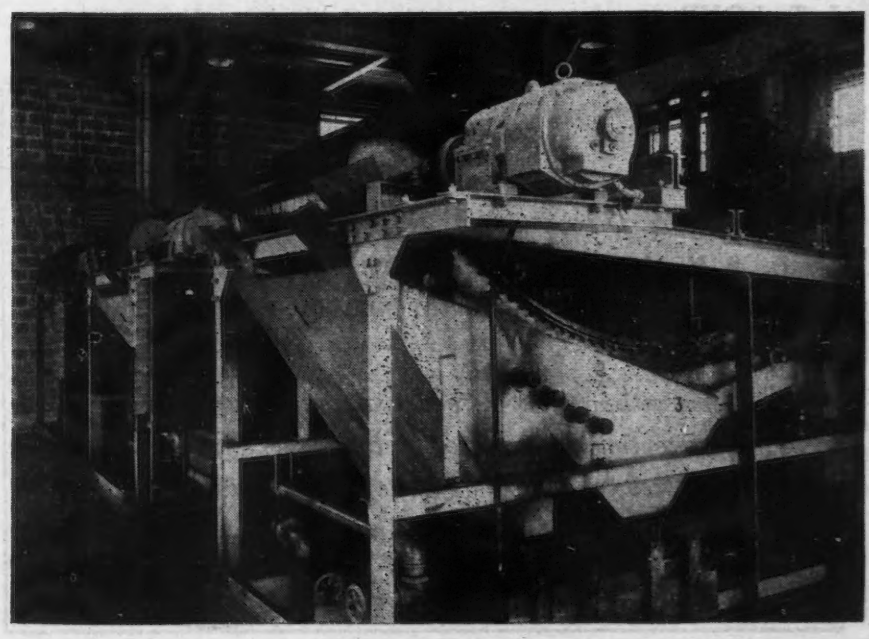
SIX DAVENPORT FINISHING SEPARATORS produce concentrates, mids, and tailings, which are removed through hoppers below the revolving belt.



Eleven hundred gallons of water per minute are introduced with the dry feed to this vibrating screen on the top floor of the fine-ore plant. Pipe on the right side feeds discharge from rod mills. Note modern fireproof construction of plant, and ample, well-lighted working space around equipment.



WET MAGNETIC ROUGHER SEPARATORS produce a concentrate and waste product.



There IS Gold In Them Thar Hills!

J. T. BOYD, General Manager, New Goldfields of Venezuela, Ltd., Ciudad Bolivar, Venezuela

Readers will recall an interesting trio of articles in the September, October, and November, 1944, issues of E. & M. J. wherein the distinguished engineer-editor-author, T. A. Rickard, scouted the veracity of several lost-mine tales.

Herewith, a stout defender of the faith rises to flout T. A.'s skepticism. Privately, we hope he's right. In any event, he relates his side of the case skillfully enough to win the sympathy of almost any jury.

Dear T. A.:

Seeing your articles in the fall numbers of *E. & M. J.* brings me back to the time when we were all hunting lost mines.

So you are trying to convince the miners that there is no such thing as "Lost Mines." Shame on you, T. A., at your age! It's equivalent to destroying a child's belief in Santa Claus! As one who has been on the trail of lost mines all his life, I protest!

A Disappointed Swede

My first acquaintance with lost mines came in the winter of 1906, when a Swede miner who worked with me on the Camp Bird, at Ouray, Colorado, came to town in

the middle of a snowstorm, carrying a gunny sack with about 70 pounds of some of the rarest ore you ever saw! Solid heavy chunks of pure calaverite, without a speck of any other mineral; chunks weighing from five to fifteen pounds each! He told me he had struck it rich, and brought his ore up to my room at the St. Elmo Hotel and poured out the chunks on my bed. The ore was malleable and black as one's hat, with some moss on it and evidently had come from the surface. His story to me was that he had lost his way in a blizzard between Ouray and Lake City, and, taking refuge in a cleft in the rocks, found a vein and hacked off the pieces while waiting for the storm to clear. I don't know of such ore existing at any point in Colorado—that is, in such massive form. He said, "Boy, I'm going to outfit next summer and go back and locate it and make Tom Walsh look like thirty cents." We smelted down the ore and he sold the bullion for $7,300.

Next summer he did outfit and go back, but never found the lode. In 1908 he went out the second time, and again failed. The disappointment drove him crazy, and he was placed in the asylum in Pueblo, where he finally died.

In 1909 I thought I would have a try, and spent the summer prospecting for it. In a stream bed I found one small water-worn pebble of the ore which I sold for $165. Next year I went back again and found nothing whatever. I determined to drop it entirely, because if I kept on I would be as crazy as the Swede. I could see that one could spend his entire life among those tremendous peaks and be unable to cover the ground.

In 1940 I hired a plane and took many pictures of the area, enough to determine that the places that I had prospected were not the most promising, and located several more that I thought should be looked over. I'm getting kind of old to try prospecting in that vicinity again.

Now there is a typical lost mine story, and, believe it or not, it's true.

Mexican Lost Mines

Did you ever go into the remote districts of Mexico, T. A., and spend the nights in small towns far from civilization? And have the "Jefe Civil" come around with the leading citizens in the evening and sit around talking in the moonlight? "Did the Senor know the story of the lost mine of the town?" (Every mining town in Mexico has its lost mine.) "Ah, well, it was like this ——" and then you would hear the most wonderful tale, part fairy story, part moonlight, of perhaps how the fabulously rich mine had been hidden by the Indians, but that in the church records it had been written down that if one looked through two of the windows of the church when the sun was so and so, the shadow of the steeple would point directly to the mine, and so on. Fascinating and incredible.

But there WERE lost mines and ARE! Some years ago I made quite a study of old records. There are still some seven rich mines that *WERE* covered up by the Indians and of which never a trace has been found to this day, in Chihuahua and Sonora.

That's how the Spaniards came to be such good prospectors.

At the time of the Hidalgo revolution in 1812, and before that in 1740, the Spaniards were all killed or driven out of that section of Mexico, and after burying their riches, the Indians removed all traces of these mines by laboriously carrying every bit of the mine dumps into the workings and covering the whole with dirt and grass.

In 1900, I believe it was, Cunningham was walking over a bare hill in Mexico without a sign of any mine working when the ground caved under him and he fell into what became known as the "Dolores mines," which he sold to an English syndicate a year later for several hundred thousand dollars. It became one of the rich mines of Mexico. I have seen the old mine tunnels with their evidence of having been filled in, rock by rock, by hand. This was one of the "lost" mines.

Of the remaining lost mines consider the case of the lost "Huacal mine," in Sonora. This was examined by Baron Humboldt, at the beginning of the 19th century, who describes it as being the richest mine he had seen in all Mexico. He does better than that: he describes the very road he covered to get to the mine up to within about three miles of the workings. Many mining engineers have spent weeks on this site, but there is not one single bit of evidence that a mine exists or ever existed. Yet in passing I will remark that the supposed site of this lost silver-gold mine presents most favorable signs of being in a leached zone covering a porphyry-copper deposit. Quite possible that a rich chimney of silver-gold ore could have been found in the bottom of one of the arroyos worked and afterwards covered up by the Indians. It has not been drilled.

Take the case of the lost Topia mine, west of Casa Grande near the Chihuahua - Sonora line. I may have possibly run on to this one some years ago myself. It certainly was one of two lost mines in that section, but it was about 40 miles away from the point where the "Topia" is supposed to be. At any rate, I found the caved remains of a very old Spanish shaft, octagonal in shape, and big dumps grown over with grass and trees, up in the timber country. My samples from the sumps ran only about 11 ounces silver. To reopen a mine in this remote section costs a lot of

money, and I did not consider it worth while. It's a long way from any known mining district.

In 1911 I had a force of Yaqui Indians working for me in Nevada. At the time they were spending every cent they earned for arms and ammunition to send back to their tribe in Sonora. I got along pretty well with them. In 1919 someone wanted me to examine the old Mulatos mine, in southern Sonora, and I made the trip on horseback south from Nacozari, several hundred miles. On the trail I met two of the men who had worked for me in the States; they went and got more of their friends, and by the time I got to Sahuaripa we had a regular circus parade. We had a wonderful time. On the way down, every day or two they would bring me beautiful pieces of rich silver and gold ores, to show them to me, but would they show me the veins where the pieces came from? Not one step!

They explained that anyone was accursed who showed a mine to a "gringo." In the old days when the Spaniards wanted to develop a mining district they took the families of a lot of the Indians and told them to go out and find mines for them—or else. That's how the Spaniards came to be such good prospectors! You cannot blame the Indians for calling the mines and anyone who had anything to do with them accursed, and covering them up when they could.

Then take lost treasures, T. A. I remember when the Mexican government dug up treasure supposedly worth about $17,000,000 when removing an old convent. I have known of several others of pretty fair size being uncovered, Pancho Villa's treasure for one, as I was invited to join the venture, but could not go at the time.

There is one fairly well-authenticated treasure of perhaps well over $100,000,000 in value in gold and silver bars that I am reasonably certain exists, and might possibly be located by electric prospecting, but I have not thought the time ripe yet to make any deal with the Mexican government.

In your own articles I want to comment on the "La Estrella mine," near the Gulf of Darien.

I went into the Gulf of Darien district to examine a supposed manganese deposit, in 1938, and at that time I heard the story of the lost "Estrella" from the natives. Their story differs from yours in that after entering the tunnel, Van Steck did not commit suicide but was killed by the government soldiers who went with him, who took the gold themselves, and reported they had found nothing, which seems quite in keeping with what one might expect. Incidentally, the "manganese" deposit I went to examine was not a workable manganese ore but rather the manganese-saturated outcrop of a gold vein likely to show a bonanza gold deposit at no great distance from the surface, so it is quite possible there may be a rich mine at that point or in that neighborhood.

Black Nuggets of Gold

Then take your statement in regard to the "Pegleg Smith mine"—"nuggets of rusty gold." You explain that this could not be; that gold "does not rust nor tarnish but retains its bright luster, etc." You are wrong, T. A. I have in front of me a nugget of gold that looks exactly like a small meteorite, as far as color and appearance go. All the large nuggets found in this part of Venezuela are similar. Furthermore, in Yuma I have seen exactly the same kind of nuggets brought in by an Indian squaw. Perhaps some of our prospectors have overlooked a bet and kicked out of the way a gold nugget, thinking it was iron.

In Venezuela, the surface gold ores contain high manganese and there might have been enough associated with the gold to account for the surface blackening. The nuggets here have considerable included quartz but very little silver, and the gold is about 92 fine. The first one of these nuggets I saw certainly fooled me. I would have bet my shirt that it was a meteorite or pure iron. Yes, it is possible for you to have black nuggets of gold.

Then there's the "Lost Dutchman mine," in the Superstition Mountains of Arizona. I have little doubt that there was a very narrow but very rich streak of ore found there, but later covered over by Indians. I also doubt that it will ever be found, because the vein was evidently too small to be followed any distance.

There's a honey of a lost gold mine in Gaspe Peninsula, south of the St. Lawrence. It produced over $2,000,000 about the years 1620-1640. Not a trace has been since found.

And so on. Yes, there *ARE* rich treasures and lost mines that will be found again some day when the world needs them badly enough. Yes, there is a Santa Claus, T. A.! Good health to you!

Maps Show Japanese Mineral Resources

DESPITE JAPAN'S SECRETIVENESS for many years, the U. S. Bureau of Mines has been able to collect voluminous information about Nipponese mines, mineral resources, and metallurgical plants, and plot them on two large-scale maps, which are now available in limited numbers. The information will be utilized by civilian and military authorities in administering the affairs of conquered Japan.

In sulphur and pyrites, the home islands were self-sufficient, and elsewhere the Empire produced arsenic, bismuth, coal, fluorspar, graphite, magnesium, and tungsten. But Japan does not have enough of the vital materials which make a modern industrial state such as ferrous metals, copper, zinc, lead, bauxite, petroleum, mica, mercury, tin, and others.

Japan's chief strength was in its huge reservoir of docile labor, technical skill, and inordinate ambition, coupled with the fact that it had built a network of modern iron, steel, aluminum, magnesium, copper, lead and zinc chemical works, in addition to fabricating plants, and electrical, cement, and other manufacturing establishments, the Bureau reports.

Industrial development has taken place during the last 77 years with startling results. The first modern iron black furnace was blown in at Yawata, on Kyushu, in 1901; the first modern zinc distillation plant was operated in 1914; and the first aluminum plant in 1934.

Although the Japanese are great imitators, their scientists are credited with the discovery of stainless silver, a magnetic alloy of nickel and aluminum, and advances in the study of cosmic rays and radio.

Argentine Mining Needs Engineers and Finance

H. MULLER, Buenos Aires, Argentina

ONLY AN EXHAUSTIVE SURVEY or a nationwide census could sum up and furnish a clear-cut picture of Argentina's present-day mineral wealth and its future potentialities. However, a cursory review of recent events will readily show that the country has gone a long way in developing its minerals and shaping its future mineral policy.

In the nine years that ended with 1943, Argentina's output in tons of metallic and non-metallic minerals has almost doubled, while values have practically trebled. From a total of 6,374,300 tons produced in 1935, output had steadily climbed to 12,559,800 tons by the end of 1943. During the same period values have risen from 98,415,600 pesos to 224,415,700.

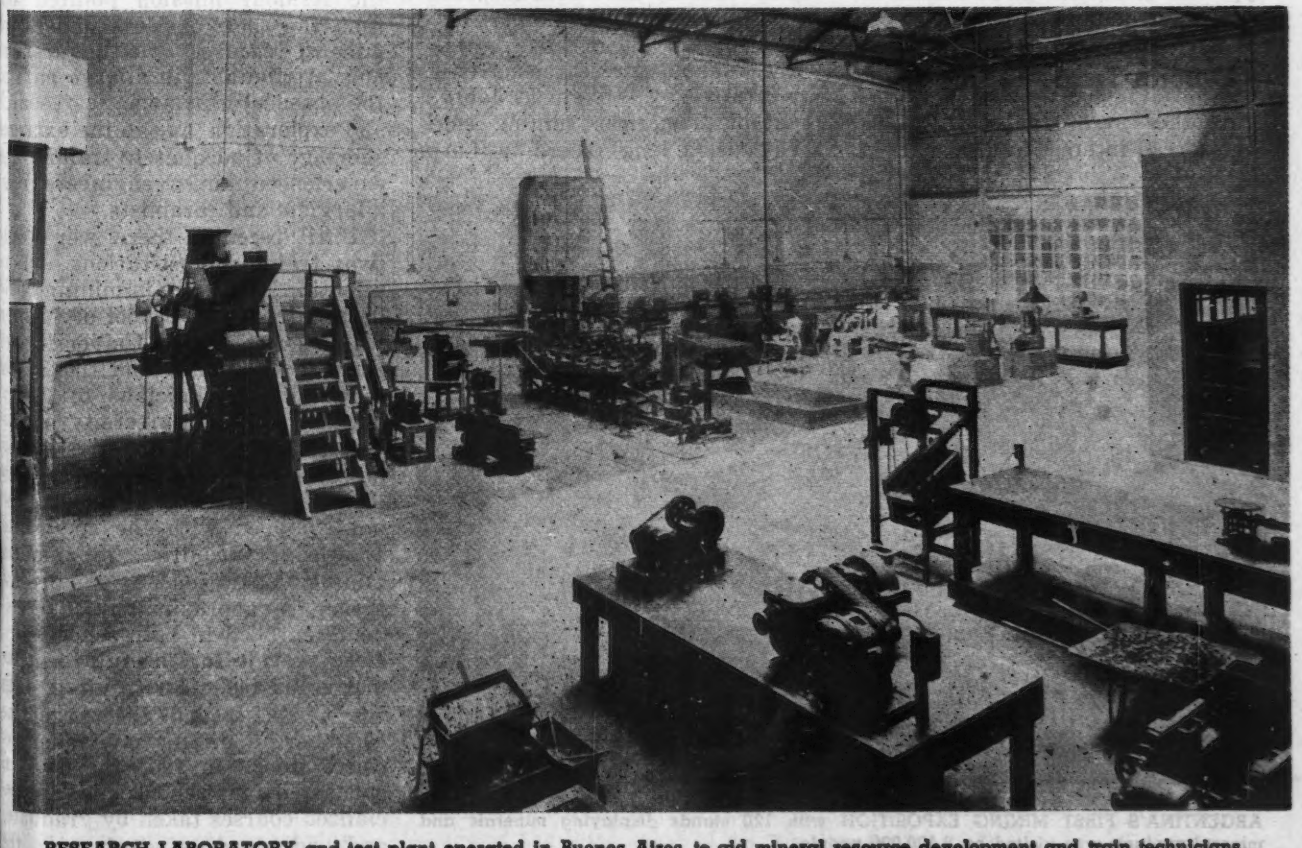
Although this expansion represents only 1/7th of the aggregate value of the cattle output and 1/8th of the agricultural output, compared with the growth of other native industries, mining occupies a high-ranking position, thanks to favorable wartime conditions. Foreign demand, particularly from the United States, has largely been responsible for the development of mineral resources, and ambitious postwar plans are now emerging.

A Successful Convention

Following a spectacular national campaign released under the slogan, "Toward a Sound and Lasting Mining Industry," mining activities at the turn of 1944 were characterized by two major events: the Second Mining Congress and the country's first mining exposition.

More than 300 mining delegates, from 14 provinces and 2 territories, were represented at the Second Mining Congress, which on Nov. 12 last year opened sessions in the spacious debating hall of the National Congress building in Buenos Aires. The delegates, who organized themselves into 18 separate commissions, each dealing on specific problems, agreed that while issues brought forth were many and important, the outstanding matters requiring immediate action were: (1) Intensified technical training of mining men; (2) Greater development of existing coal deposits; (3) Extension of rail facilities to coal deposits, and (4) Financial aid—the need for a permanent mining fund.

During Congress meetings it was



RESEARCH LABORATORY and test plant operated in Buenos Aires to aid mineral resource development and train technicians.

also strongly urged that the Mining Code needs amending on the grounds that it is outdated, but after much heated debate delegates finally concluded that the code should be submitted to a more thorough tryout.

After ten days of continuous sessions, delegates, summing up their work, made one last announcement: The Second Mining Congress has achieved one of its major objectives—mining was one more step nearer to genuine cooperation. Looking ahead, delegates were then reminded that Argentina's Third Mining Congress would be held in the wealthy mineral-producing province of Salta, during 1946.

Even more impressive to the general public was the display offered by the opening in Buenos Aires of the First Mining Exposition, which was inaugurated on December 18th to complement the Second Mining Congress. The main gateway of the exposition was featured by an enormous statue personifying "Pacha Mama"—Mother Earth—goddess of the Incas, and some 2½ million people are reported to have visited the show during its 76 days. Occupying a space of 12,500 square meters, the exposition is reported to have cost 700,000 pesos. It included 120 attractive stands exhibiting samples of every available type of mineral as well as numerous displays of mineral products.

Official Trade Promotion

Another event that has caused widespread interest in local mining circles was the official inauguration toward the end of last year of the newly-built mining research laboratory and experiment plant of the Argentine Trade Promotion Corp.

Commonly known as the C. P. I. (Corporación para la Promoción del Intercambio), the Argentina Trade Promotion Corp., which maintains four branch offices in the United States—New York, Chicago, San Francisco and New Orleans—is a semi-official organization formed in the year 1941 to promote exports to the United States. To carry out its promotional activities, the C. P. I. is granted an income resulting from exchange profits on the export of certain products, including minerals. Thus, when United States war demand for strategic supplies augmented Argentine exports, the C. P. I. took an immediate interest in the development of mines.

No time was lost in the formulating of an elaborate plan for applied technological research. With priority-released equipment brought down from the United States, the C. P. I. promptly proceeded to set up Argentina's first modern mining laboratory and experimental plant in Buenos Aires, fitted with complete and up-to-date installations for concentrating, and analysis. Numerous mines throughout the country have been inspected and hundreds of ore samples have been collected and tested.

These far-flung research activities are directed by William F. Jahn, a reputable American mining engineer with a long record in Latin American mining activities. Mr. Jahn was engaged by the C. P. I. in the month of March, 1943, and is at present assisted by Walter S. Sims, an experienced American metallurgical engineer, who has also been working in Latin American countries. James Sterling, a Chilean by birth, handled most of the field work. As a mining engineer graduated from the School of Mining of Colorado, for many years he has been actively engaged in mining in his native country, and later in Bolivia and Argentina.

ARGENTINA'S FIRST MINING EXPOSITION with 120 stands displaying minerals and mineral products was visited by 2,500,000 people.

Education Needed

Among the factors that have most retarded development of Argentina's ore deposits is the lack of trained labor and experienced technical men, and all recent efforts to boost the country's mineral wealth have been handicapped by this insufficiency. The Armour Research Foundation of Chicago, which was engaged in 1942 by the C. P. I. to carry out an extensive technological and economic survey of Argentine industries, could hardly have emphasized this deficiency more boldly in its recommendations for applied technology. After inspecting numerous mines, plants, schools, universities and laboratories in a tour that required zigzagging some 40,000 kilometers across the country, the Armour mission pointed out that the lack of development of mineral resources was unquestionably attributable in a large part to the absence of systematic research and exploration, and to the extreme shortage of adequately trained and experienced mining engineers, metallurgists and ceramists.

Until recently there were only two training institutions where scientific knowledge in mining could be acquired: the School of Mining Engineers of the University of Cuyo in San Juan, and the School of Mining Technicians of Jujuy, annexed to the University of Tucumán. It is repeatedly stressed, however, that in many respects graduates from these schools are not equipped with the specialized knowledge required in modern mining operations. At present there are approximately 200 students enrolled in both schools.

To provide for the future in the matter of technical training, both the C. P. I. and the Argentine Chamber of Mining have taken decisive steps. In 1943 the C. P. I. sponsored four scholarships in specialized courses taken by graduates and advanced students in the

Mining School of the University of Chile, and during 1944 two additional such scholarships have been granted. For trainees who wish to acquire practical laboratory instruction, the C. P. I. also has a special section for students in its Buenos Aires Laboratory.

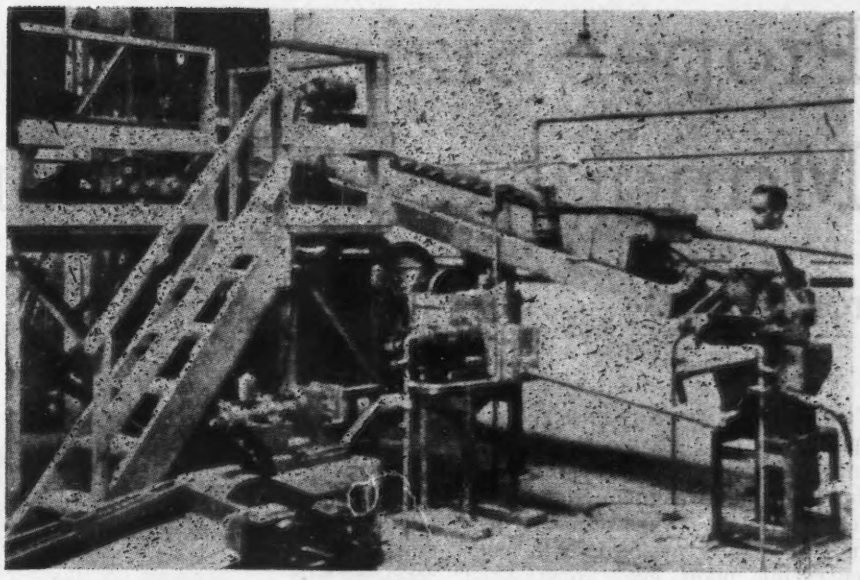
The Argenine Chamber of Mining, now entering its fourth year of activities and having a membership list of almost 900 associates, created its own mining school in the month of July last year. According to the chamber, in less than twelve months the enrollment reached a total of 650. Although it is a completely independent institution, the new mining school functions in the classrooms of the faculty of engineering of the University of Buenos Aires, where laboratory equipment and other research facilities are available. Designed to prepare students as mine foremen, the school's three-year course is conveniently offered to pupils who wish to receive classroom instruction and to those who must take home study lessons. In succeeding years admission requirements will tend to become stricter, but for the time being they are lax in order not to discourage applicants. Ultimate aims of the chamber are to improve gradually on teaching standards and to introduce the same curricula now offered in United States mining schools and universities.

Easier Credit Needed

Other problems confronting the country's mining industry are: difficulties of transport; absence of a flexible, easy-term credit system to help finance the industry; and lack of mining equipment.

The lack of financial aid has placed mining in Argentina at a disadvantage compared with other industries. Of the 15-million-peso loan funds—10 million for coal and 5 million for metallic ores—which the Government opened for miners in the Bank of the Argentine Nation, so far only 425,000 pesos have been borrowed. Credit-seekers protest that they are unable to adjust themselves to the bank's money-lending policy based on strict, short-term, high-interest rates, which may well suit the pockets of the more wealthy cattle and agricultural industries, but not the undeveloped mining industry.

Although delegates at the last Mining Congress unanimously agreed that present-day mining activity already warrant an independent mining bank, they emphasized that what was needed at the moment was a 100 million peso loan fund with low interest rates and long terms available. Pointing out that such a credit scheme had long been a fond hope of the mining industry, delegates on the finance and credit committee of the last congress meeting submitted a proposal to the Government requesting that a special fund be opened in the Industrial Credit Bank. It was stated that the mining industry would easily absorb 40 million pesos before the end of 1945.



CONTINUOUS TESTS are possible with this grinding and flotation equipment used to aid Argentina's miners. William F. John directs laboratory's research programs.

In the way of modern mining equipment, machines and general accessories, Argentina offers a ready market, particularly taking into account the fact that imports have been at a standstill since the beginning of the war. While several United States manufacturers are submitting their first postwar catalogs and making tentative offers, Swedish importers have started delivery of limited supplies.

Tungsten Troubles

Although official figures covering 1944 mineral production have not been disclosed, output of metallic ores is generally believed to have continued on fairly good levels. Of the ore deposits that have prospered under wartime demand, the wolfram mines are pre-eminent. Unfortunately, however, this prosperity has not come without setbacks.

Already in 1943, wolfram mining had soared until it reached 47 percent of the total value of all metallic ores. Thus, by the end of 1944, wolfram mining had come to be the principal, if not only, means of livelihood of some 10,000 workers and 30,000 dependents. In San Luis province alone, where two-thirds of the ore occurs, it is estimated that 80 percent of the available manpower was steadily engaged in the extracting of wolfram.

Greatest economic setback to wolfram mining came early in 1944 when the Argentine Ministry of Finance ceased allowing wolfram to be exported at its preferred exchange rate: It was decreed that the ore would receive the same fixed rate granted to the so-called regular export products, namely, 335.82 pesos per 100 dollars. Wolfram export values had already suffered a similar reduction in the previous year, when the rate was brought down from its former high of 421.82 pesos per 100 dollars to 398.02 pesos. Hence, the second exchange revision, which pulled export values down a total of 24 percent, was a serious setback.

After suffering for almost the whole of 1944, at the end of the year miners finally succeeded in getting the Ministry of Finance to shift the rate back to 398.02 pesos per 100 dollars. However, in November Argentina's three-year contract with the Metal Reserve Co. expired. These factors, together with a number of other problems of a technical and commercial nature, have caused wolfram (65%, WO_3) to fall from its former high price of 5,080 pesos per ton to its present Buenos Aires market quotation of 3,360 pesos.

Proper Sizing Improves Manganese Concentration

TOM SHIRAS, Mountain Home, Arkansas

THE DAVIS MINING ENTERPRISES, operating on the Southern Hill and Polk-Southard properties, in the Batesville-Cushman manganese field, Arkansas, has the largest manganese-ore washing and concentrating plant ever constructed in the State. The plant has a capacity of 1,000 tons of crude ore per shift. This crude ore contains high-grade disseminated manganese ore that occurs in small particles in the residual clay deposits derived from the St. Clair and Fernvale limestones. It is mined from open pits with power shovels and hauled to the plant in large trucks.

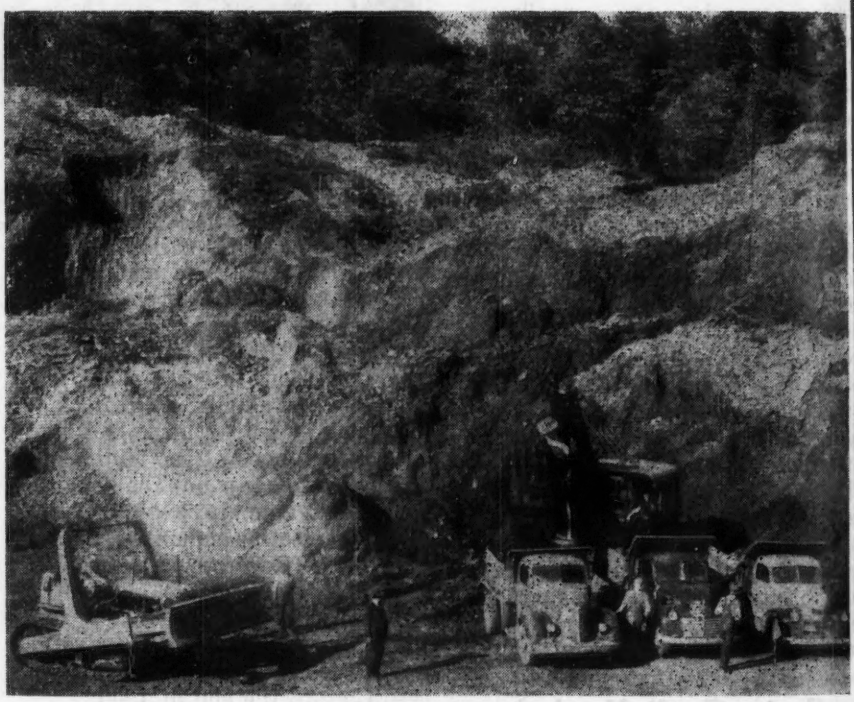
When the ore reaches the plant it is dumped into five puddling pits, or grizzlies, four of which are eight feet square and one of which is eight by twelve feet. All are six feet deep. The rails at the bottom of each pit are spaced four inches apart.

When a load of crude ore is dumped into any of the puddling pits, a strong stream of water is turned on it. This washes most of the solids into three 25-ft. modern log washers. The fines go into a ditch that carries the waste water into a large pond below the mill.

Jigs Concentrate Ore

After passing through the logs, the washed ore goes to a 16-in. belt conveyor, which carries them to a large 1-in.-mesh scalping screen at the top of the mill. The oversize goes to the picking belt, where the lump ore is saved by hand picking. Reject material goes to the dump.

The minus 1-in. scalping-screen undersize is screened into four products: plus one-half inch, minus one-half plus one-quarter, minus one-quarter plus one-sixteenth, and minus one-sixteenth. Plus one-half-inch material is concentrated by a double jig, four cells to each unit. The next size is handled similarly. Minus one-quarter plus one-sixteenth material is delivered to two 5-cell jigs. Minus one-sixteenth



A POWER SHOVEL, aided by a bulldozer, loads the manganiferous clay into dump trucks which haul the ore to the washing and concentrating plant.

CONVEYOR in foreground is delivering washed ore to scalping screen at top of mill. Picking-belt house is upper right, with ore bin below. Coarse ore dump is extreme right. Mechanical concentration is in building at lower left.

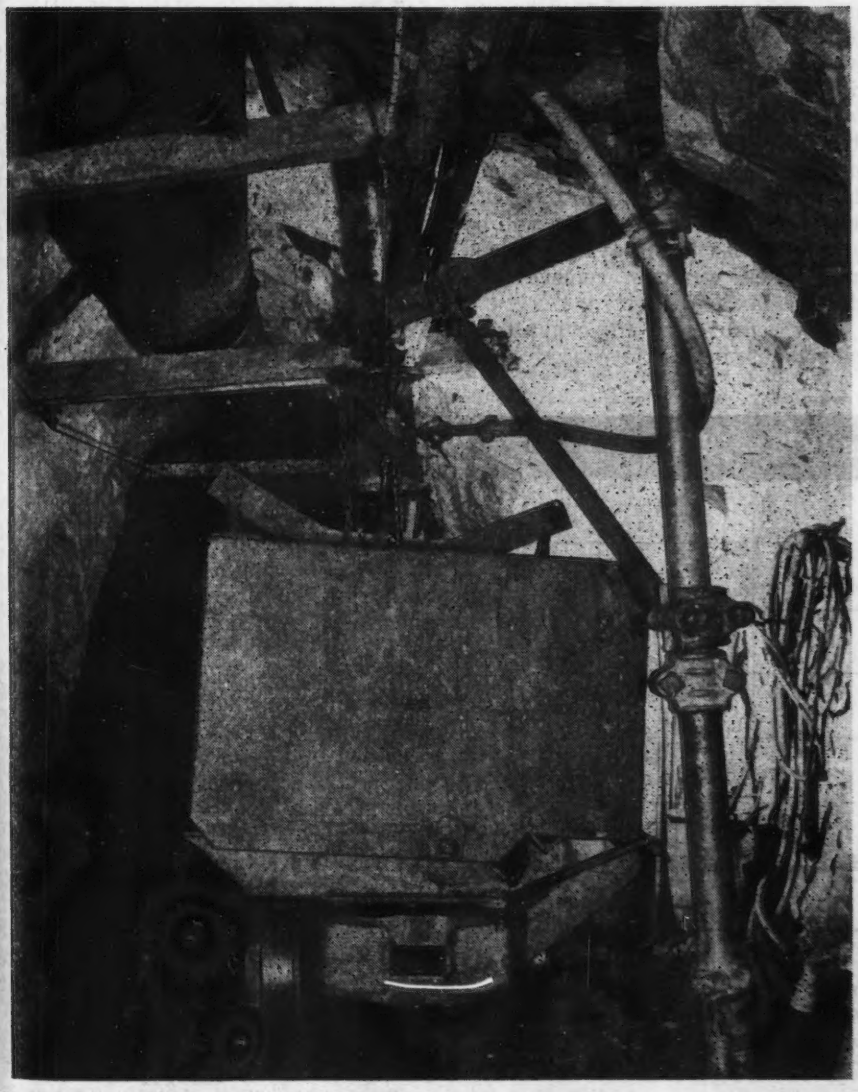
product goes to six Butchart tables.

Separate treatment of four different sizes is a forward step in the district's concentration practices, resulting in a cleaner product and improved recoveries.

The ore, disseminated in residual clay from the St. Clair and Fernvale limestone, has been a frozen asset to the Batesville-Cushman field ever since manganese mining started in the 'sixties. Large deposits of this disseminated ore lie in many sections of the field, but because of lack of proper equipment and technical skill, little was mined until the Davis Mining Enterprises started operations. This organization entered the field in August 1944, and put the plant in operation in February 1945.

Cherry Picker Built Like Jib Crane

THE ILLUSTRATED CHERRY PICKER has given excellent service in the driving of long development headings at the National Tunnel & Mines Co. plant, Tooele, Utah. It is built like a column jib crane, consisting of a standard drill column bar and long arm; extra arm clamp; safety collar; a short length of 2-in. pipe; and an air cylinder with pivoted car holder at the end of the piston rod. The complete assembly requires less headroom than a conventional set-up in a main drift, the sill can be level with the top of the ties, and only 2½ ft. of additional drift width is needed for the car lifted off the track.



EMPTY MINE CAR is raised from tracks by air cylinder, and swung aside into transfer station while suspended from revolving jib crane.

A few plugs in the wall drilled with the regular heading round will cut out the required space, and only 15 minutes of hand mucking are required to clean up the sill. When the drift face has been advanced 20 ft., the cherry picker is taken down and moved ahead by the haulage crew while the drift round is being drilled and the new transfer station prepared. About 30 minutes is required to do this job.

To operate the picker, the arm carrying the air cylinder is first swung out over the car. The air valve is closed, thereby causing the car holder supported by the piston to drop below the top edges of the car. After hooks at the ends of the holder have been held in position properly to engage the rolls or shoulders on the top edge of the car, the air valve is opened. This forces the piston upward, causing the hooks on the holder to engage the car shoulders, and lifts the car slowly off the tracks. The car is then set back in the station.

Cars are handled with equal simplicity while removing broken material from the drift face, after a round has been blasted. Loaded cars are always at the front end of the locomotive, and empty ones behind, with one empty car suspended from the cherry picker. After a newly loaded car has been picked up, the train is rolled back past the transfer station. The empty car on the cherry picker is swung over the track, dropped, and rolled to the drift face. An empty car is uncoupled from the tail end of the train as it passes the cherry picker, lifted off the track, and set back into the station. These operations are repeated until the face has been mucked out.

L. F. Williams, mine foreman, developed the device. Its first cost is about $200. One unit in constant operation for eight months handled more than 8,000 cars, and required no repairs or replacements.

Capital Gains Taxation Strangles New Growth

HERBERT SPENCER, South Pasadena, Calif.

AFTER THE WAR, small business will need help—real help and plenty of it. At present the cards are stacked against small business, particularly against new enterprises. War casualties to small business may have been heavy but, if we are to have full postwar employment, small business will have to furnish nearly 50 percent of the jobs.

To provide that powerful incentive which is needed to stimulate the undertaking of many new ventures we must have a comprehensive revision of Federal tax policies affecting new ventures.

Such revision of wartime taxation will set the pattern of our economic life for generations to come. It is the most important single thing Congress will have to do after the war. If it is not wisely conceived to encourage new enterprises, we may be faced with the danger of Government intervention to prevent unemployment.

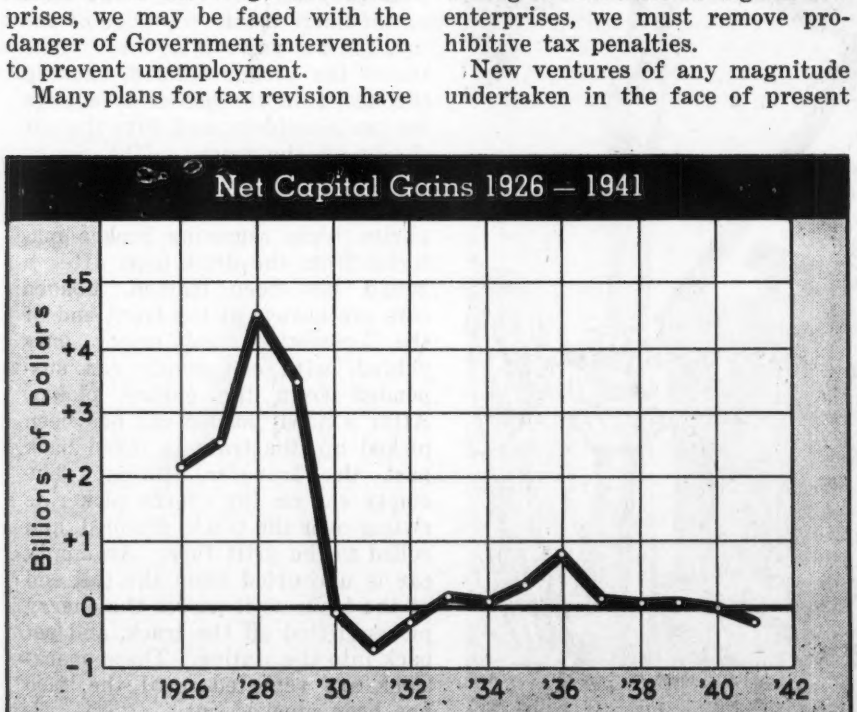
Many plans for tax revision have been prepared, bringing out many different points of view. In such a debate, if we can find one common point of agreement among the different plans, that point may usually be accepted as the real kernel of truth in the whole argument. In the current controversy there is one such common point of agreement. That is on the need for tax incentives to stimulate the use of risk capital in new enterprises.

Our modern leaders stress human rights as opposed to property rights. We should not forget that owners of small capital savings are also human; that, to them, there is no more important human right than the privilege of striving to protect the economic future of their families. If we wish to create conditions under which they will be willing to risk their savings in new enterprises, we must remove prohibitive tax penalties.

New ventures of any magnitude undertaken in the face of present excess profits tax rates are probably doomed to failure. Repeal of this tax or reduction in rates depends on unpredictable events. In view of these uncertainties and the urgent need to get things started again it would seem reasonable to ask now for total exemption from excess profits tax for new enterprises started after the end of the war. Such an exemption would give new business a chance to compete with great corporations fortified by wartime earnings. As the excess profits tax will eventually be removed, such advantage to new business would be only for a limited time.

Under our G.I. Bill of Rights we have offered our veterans loans to encourage them to start new ventures of their own. An early report states that, of 1,700 applications for loans by veterans, only 4 were for the purpose of starting a new business. These men recognize the fact that they are defeated by present taxation even before they make a start. In view of all they have risked for us, could we not well afford to say to them that any new business started by a veteran will be tax free for some reasonable period of time? Many of them will be coming home with new skills and abilities, eager to try them out. All they want and need is a fair chance to get started. Some of them may develop into important employers of the future.

For many years past we have crucified our potential new growth on the altar of the capital gains tax. Used at constantly increasing rates, there is no way to measure the economic damage we have suffered from this unsound tax. In order to penalize the operations of a few speculators, we have all endured a form of taxation which destroys incentive and adds greatly to the risk of any new undertaking. A capital gain may represent the efforts of a lifetime, yet, when realized, it is all or part considered as income earned in the year of



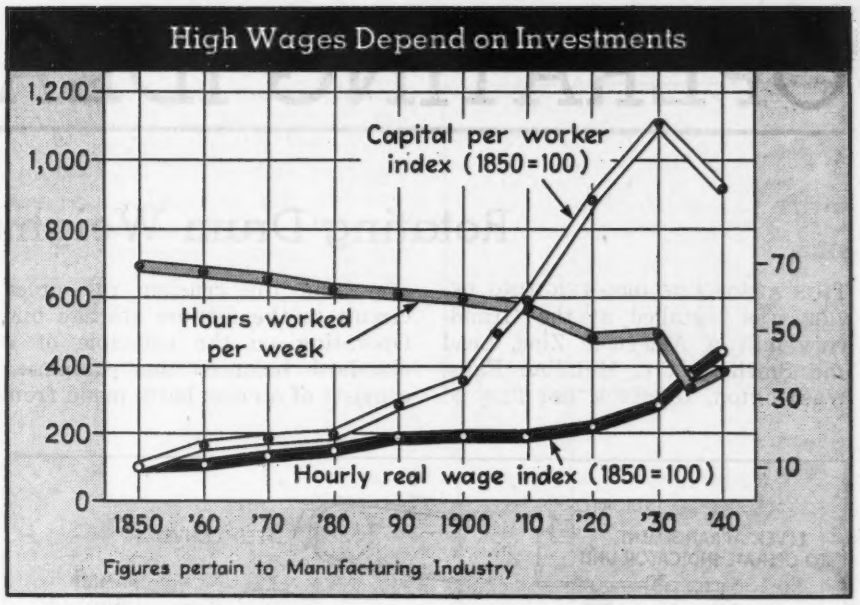
SOMETHING IS WRONG. In this great and wealthy country, net capital gains in the years 1930-41 averaged only $52 million per year.

realization and taxed at the rates then in effect.

It is strangely anomalous to our supposed American efficiency that we have put up with this form of taxation as long as we have. It is cumbersome and costly to enforce. After all the trouble we endure over it, it is a futile tax. For many years it has not produced important revenue for the Treasury nor has it ever properly regulated or controlled speculation. During the time that this tax has been in effect we had the greatest boom and the greatest depression in history. There is little doubt that the capital gains tax accentuated both sides of that unhappy experience.

One of the objections offered against repeal of the capital gains tax is that such action would be inflationary. On the contrary, anything which would unfreeze the bona fide investor from his investment and permit him to realize capital growth without heavy tax penalty, would bring out many sellers. It would give us conditions of a free market more representative of actual values. The proposal of the Committee for Economic Development that such gains be taxed 100 percent as income would only freeze the investor more tightly to his unrealized growth of capital, thus causing greater danger of inflated values. This plays directly into the hands of speculators who can count on the investor to hang on. The whole proposition of trying to cure the disease of inflation by cooling the thermometer registering its symptoms lacks realism. The cure for inflation does not lie in crushing taxation on the growth of that capital which provides new enterprises, employment, production and an economy of plenty. These are the natural barriers against inflation.

A splendid study of the effects of this taxation has been made by Dr. Wilford I. King, professor of Economics at New York University. It is entitled "Raising the Workingman's Scale of Living." He shows that from 1849 to 1939 investment in tools per factory worker increased from $557 to $5,080, working hours were cut in half and buying power of wages increased four times. This is the greatest rise in the standard of living the world has ever known. It shows the result of the American free enterprise system at work. But since 1930 the impact of Federal taxation has caused a reduction of $1,072 in tool investment per worker. This is a dangerous trend, one that could lead to reduced earnings and standards of living.



The wage increases indicated would not have been possible without a large growth in capital invested per worker. Are we going to limit our future by strangling capital?

Dr. King makes the sound point that the interests of labor can best be promoted by increased use of savings and creation of new capital. When invested in tools and machinery this gives each worker greater productive power. We should not forget that a large part of our newly created capital has come from development of natural resources. Think what has been added to our capital from iron, copper, oil and other minerals, to say nothing of agriculture, timber and water power. The American Indians had all these resources, they neither discovered nor used them. One of the most hazardous forms of new enterprise is the discovery and development of these resources. Both risks and rewards are great, and on this type of undertaking the capital gains tax lays a heavy and repressive hand. Repeal of this tax would stimulate discovery and use of new natural resources, thus adding to our capital available for productive use and replenishing our known resources depleted by war. When these capital gains are siphoned off by taxation, Government actually performs an inflationary act by removing such capital from use in production. At the same time it prevents labor from securing the benefit of the use of such increases of capital in improved tools and machinery.

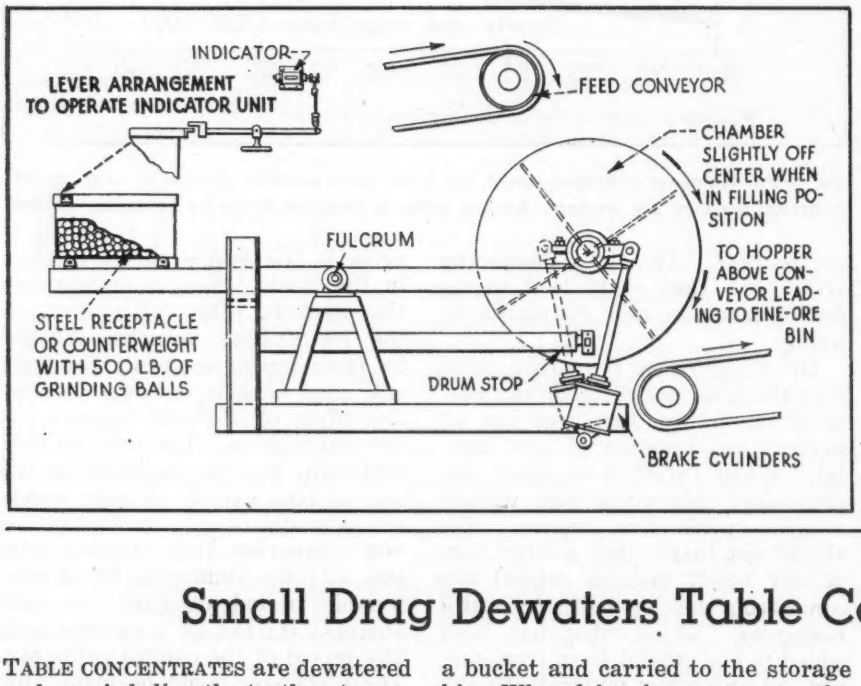
To summarize . . . We can all agree that American free enterprise is the best economic system in the world. But to re-establish this system, after withdrawal of the tremendous impetus afforded by Government spending for war, will take serious consideration of the effect of Federal taxation on new enterprises. Tax revision that will really provide incentive for the use of risk capital in new enterprises would be (1) exemption for new enterprises from excess profits tax, (2) tax immunity for a reasonable period of time for new business started by a veteran and, (3) repeal of the capital gains tax. These changes could be made now at no great cost to the Treasury.

Ultimately, we will of course need full-scale reduction of wartime tax rates. If we can safely pass through this immediate postwar period and reinvigorate and expand our American system of free, private enterprise by providing tax incentives for the establishment of many sound, new undertakings, we can then logically look forward to another cycle of growth and prosperity long since overdue. There will be every reason for optimism and confidence in our future if, by tax changes, we can be given the chance to help ourselves. The only way we will get that chance is to insist that our public leaders give us not only inspiring words, but that they realistically face now the hard facts of Federal taxation, and give us that relief for new enterprises which will encourage their inception on a large scale. Then there may be employment and prosperity for us all.

OPERATING IDEAS

Rotating Drum Weighs Ore

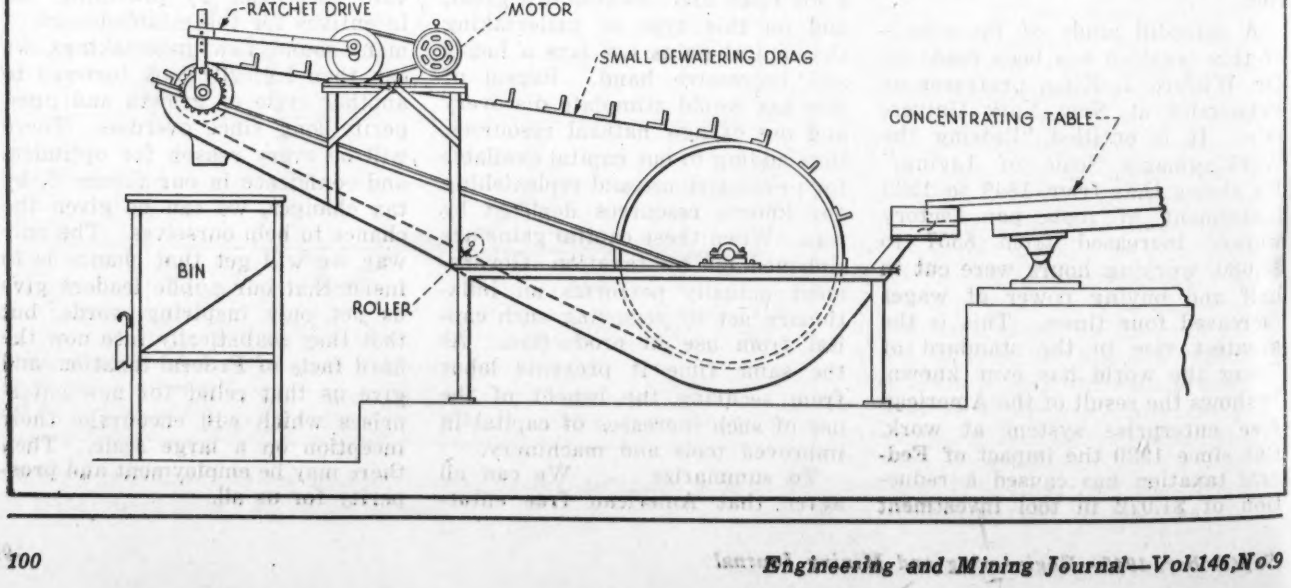
THIS AUTOMATIC ORE-WEIGHING DEVICE was installed at the Grandview mill of American Zinc, Lead and Smelting Co., Metaline Falls, Washington, to check the flow of ore from the crusher roll-screen circuit to the fine-ore storage bin. Operating on the principle of a standard balance, the equipment consists of a cross beam made from two lengths of channel iron; a revolving drum with four measuring chambers; two brake cylinders with oil fill; two angle-iron supports; a simple drum stop; a steel box or counterweight; and a lever arrangement to operate the indicator or counter installed above the steel box containing a 500-lb. load of grinding balls.


INDICATOR
LEVER ARRANGEMENT TO OPERATE INDICATOR UNIT
FEED CONVEYOR
CHAMBER SLIGHTLY OFF CENTER WHEN IN FILLING POSITION
FULCRUM
TO HOPPER ABOVE CONVEYOR LEADING TO FINE-ORE BIN
STEEL RECEPTACLE OR COUNTERWEIGHT WITH 500 LB. OF GRINDING BALLS
DRUM STOP
BRAKE CYLINDERS

Each chamber of the drum is slightly off center when in the filling position. As the chamber fills with ore, the drum moves downward gradually and disengages the drum stop when the actual discharge point is reached. The drum then revolves, discharges the contents of the loaded chamber, rises, and is locked when the chamber is in the filling position. Movement of the drum after unloading is controlled by the oil-filled cylinders on opposing cranks (180 deg.) serving as brakes. The lever connected to the counter is moved by the box.

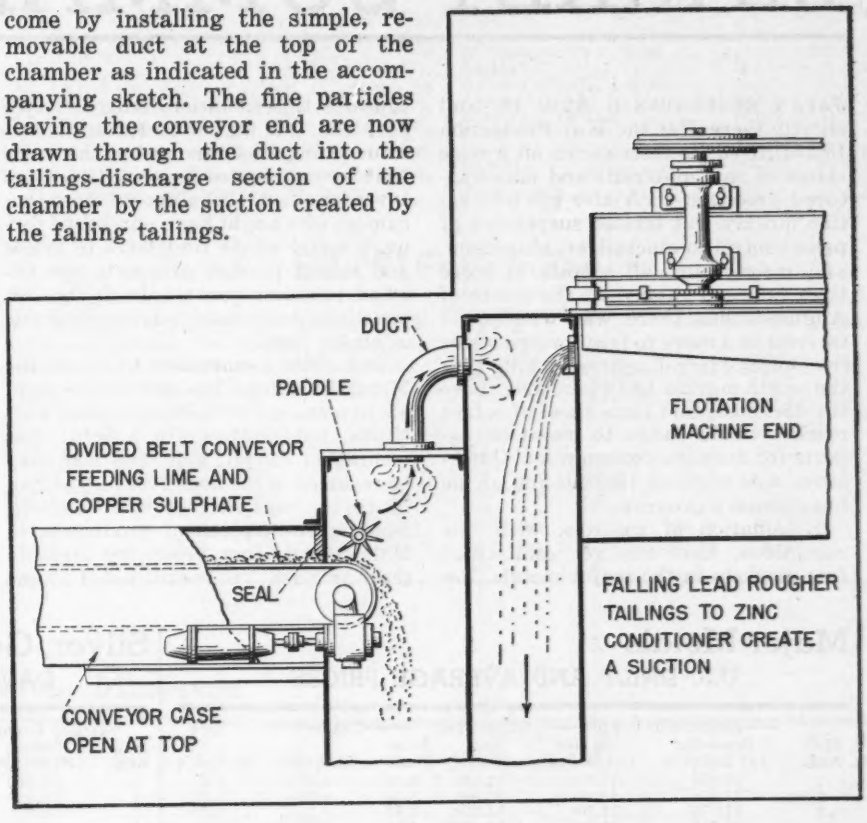
Small Drag Dewaters Table Concentrates

TABLE CONCENTRATES are dewatered and carried directly to the storage bin by a small drag at the Eagle Shawmut concentrator near Chinese Camp, Calif. Formerly concentrates flowed into a settling box by gravity to be removed periodically with a bucket and carried to the storage bin. When labor became scarce the operation was abandoned and replaced by the illustrated mechanical equipment. Built like a conventional drag classifier, the unit is powered by an electric motor and driven through a simple ratchet drive. Rakes transport the coarse particles to the discharge port just below the drive pulley, whence they fall by gravity into the storage bin below. This innovation has performed satisfactorily to date.



Simple Duct Solves Dust Problem

AT THE CONCENTRATOR of Bunker Hill & Sullivan Mining & Concentrating Co., Kellogg, Idaho, an irritating dust problem was solved recently in a simple and ingenious way, according to C. Y. Garber, superintendent. The inconvenience occurred at the discharge end of the lead circuit, where both tailings and reagents are directed via an inclosed and partitioned chamber made from sheet iron to the zinc conditioner below. Here, copper sulphate and lime are introduced by a short belt conveyor, with the feed end protruding into the chamber, which is sealed by a canvas or rubber curtain to prevent dusting. It was noticed after a brief period of operation that the fine copper sulphate and lime particles escaped through the minute openings around the curtain area, covering the conveyor casing, conveyor drive mechanism, and nearby flotation equipment with fine dust. Falling tailings produced a back-pressure which forced the fine particles through the openings mentioned. The difficulty was completely overcome by installing the simple, removable duct at the top of the chamber as indicated in the accompanying sketch. The fine particles leaving the conveyor end are now drawn through the duct into the tailings-discharge section of the chamber by the suction created by the falling tailings.

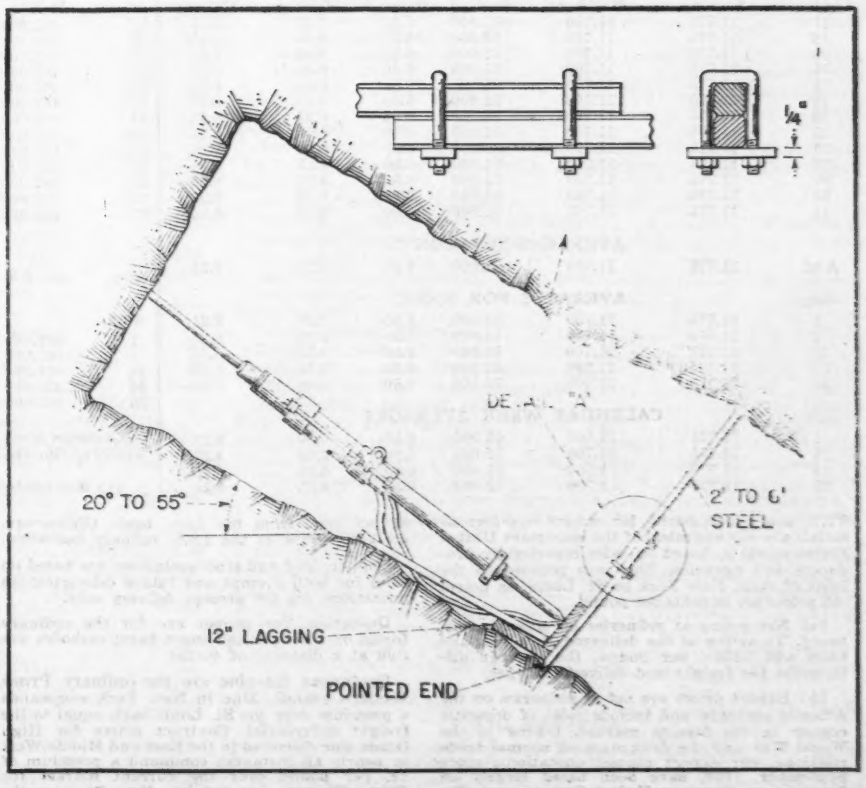

DUCT
PADDLE
DIVIDED BELT CONVEYOR FEEDING LIME AND COPPER SULPHATE
SEAL
CONVEYOR CASE OPEN AT TOP
FLOTATION MACHINE END
FALLING LEAD ROUGHER TAILINGS TO ZINC CONDITIONER CREATE A SUCTION

Clamped Steels Support Stoper Staging

LENGTHS OF SQUARE (quarter-octagon) drill steel clamped together with U-bolts provide a safe staging for drilling operations in flat untimbered raises and stopes. M. A. Morse, of Stockton, Calif., states that the steel staging here illustrated can be erected quickly and eliminates the necessity of cutting and wedging wooden sprags.

Two sets of clamped steels are used for a staging. Each set consists of a 2- to 6-ft. length of drill steel, a short, pointed steel, and two U-bolts. After the set has been extended to fit securely into small hitches in the raise or stope walls, the U-bolts are clamped tightly to prevent slippage. Twelve-inch lagging is then placed on top of the steel sets to support the stinger of the stoper and provide a platform for the workman and his tools.

Mr. Morse states that the staging is convenient because the miner is able to use drill steel which is necessarily available in stopes and raises. This staging may be used in raises as steep as 55 degrees.



MARKET SUMMARY

JAPAN SURRENDERED AUG. 14, and shortly thereafter the War Production Board lifted its restrictions on a wide range of raw materials and manufactured products. OPA also got into action quickly, but limited suspension of price control to quicksilver, aluminum, and magnesium, all metals in more than sufficient supply. As the month of August ended there was widespread interest in a move to free foreign silver from price control, sellers arguing that the world market had risen well above the 45c. basis and little short of a free market would suffice to maintain imports for domestic consumption. Quicksilver was weak on cancellation of the huge battery program.

Elimination of controls, with few exceptions, have not yet established free markets in the major metals. Because of this condition, sellers of copper, lead, and zinc were forced to continue doing business under the rules that have prevailed for some time past. Inventory controls hampered those consumers who might have purchased forward metal where confidence in prices and bright market prospects for finished products prevail. Inventory restrictions were eased only on materials in ample supply.

In London a movement to reopen the Metal Exchange has not yet brought about a change in the Government's attitude, but traders are hopeful that trading in copper, zinc, and lead may be resumed in the near future. Trading in tin is regarded as more remote, pending resumption of production in Malaya and other producing areas in the Far East. Tin is still listed as one of the metals in light supply.

Copper consumption, based on figures assembled for the fabricating division of the industry, dropped to 79,739 tons in July, the lowest level since July 1940. This compares with 117,492 tons in June and 118,632 tons in July last year. The peak in consumption was 171,558 tons in March of the current year. Production of refined copper in July amounted to 72,995 tons, which compares with 74,377 tons in June. Sales booked for August and September indicate that domestic production, plus a moderate tonnage of imported copper, have been disposed of, with the result that price uncertainty did not exist. Some foreign business was booked at a premium over the established price, largely through dealers. However, the tonnage sold abroad was

Major Metals

U.S. DAILY AND AVERAGE PRICES

1945 Aug.	Electrolytic Copper: Domestic (a) Refinery	Electrolytic Copper: Export (b) Refinery	Straits Tin: New York	Lead: New York	Lead: St. Louis	Zinc: St. Louis
1	11.775	11.700	52.000	6.50	6.35	8.25
2	11.775	11.700	52.000	6.50	6.35	8.25
3	11.775	11.700	52.000	6.50	6.35	8.25
4	11.775	11.700	52.000	6.50	6.35	8.25
6	11.775	11.700	52.000	6.50	6.35	8.25
7	11.775	11.700	52.000	6.50	6.35	8.25
8	11.775	11.700	52.000	6.50	6.35	8.25
9	11.775	11.700	52.000	6.50	6.35	8.25
10	11.775	11.700	52.000	6.50	6.35	8.25
11	11.775	11.700	52.000	6.50	6.35	8.25
13	11.775	11.700	52.000	6.50	6.35	8.25
14	11.775	11.700	52.000	6.50	6.35	8.25
15	Holiday	Holiday	Holiday	Holiday	Holiday	Holiday
16	Holiday	Holiday	Holiday	Holiday	Holiday	Holiday
17	11.775	11.700	52.000	6.50	6.35	8.25
18	11.775	11.700	52.000	6.50	6.35	8.25
20	11.775	11.700	52.000	6.50	6.35	8.25
21	11.775	11.700	52.000	6.50	6.35	8.25
22	11.775	11.700	52.000	6.50	6.35	8.25
23	11.775	11.700	52.000	6.50	6.35	8.25
24	11.775	11.700	52.000	6.50	6.35	8.25
25	11.775	11.700	52.000	6.50	6.35	8.25
27	11.775	11.700	52.000	6.50	6.35	8.25
28	11.775	11.700	52.000	6.50	6.35	8.25
29	11.775	11.700	52.000	6.50	6.35	8.25
30	11.775	11.700	52.000	6.50	6.35	8.25
31	11.775	11.700	52.000	6.50	6.35	8.25
	AVERAGES FOR MONTH					
Aug.	11.775	11.700	52.000	6.50	6.35	8.25
	AVERAGES FOR WEEK					
Aug. 1	11.775	11.700	52.000	6.50	6.35	8.25
8	11.775	11.700	52.000	6.50	6.35	8.25
15	11.775	11.700	52.000	6.50	6.35	8.25
22	11.775	11.700	52.000	6.50	6.35	8.25
29	11.775	11.700	52.000	6.50	6.35	8.25
	CALENDAR WEEK AVERAGES					
Aug. 4	11.775	11.700	52.000	6.50	6.35	8.25
11	11.775	11.700	52.000	6.50	6.35	8.25
18	11.775	11.700	52.000	6.50	6.35	8.25
25	11.775	11.700	52.000	6.50	6.35	8.25

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

1945 Aug.	Sterling Exchange: "Checks" (Nominal)	Silver (c): New York	Silver (c): London	Gold: London	Gold (d): United States
1	402.000	44.750	25.500	172s. 3d.	$35.000
2	402.000	44.750	25.500	172s. 3d.	35.000
3	402.000	44.750	25.500	172s. 3d.	35.000
4	402.000	(e)	(e)	(e)	35.000
6	402.000	44.750	Holiday	Holiday	35.000
7	402.000	44.750	25.500	172s. 3d.	35.000
8	402.000	44.750	25.500	172s. 3d.	35.000
9	402.000	44.750	25.500	172s. 3d.	35.000
10	402.000	44.750	25.500	172s. 3d.	35.000
11	402.000	(e)	(e)	(e)	35.000
13	402.000	44.750	25.500	172s. 3d.	35.000
14	402.000	44.750	25.500	172s. 3d.	35.000
15	Holiday	Holiday	Holiday	Holiday	Holiday
16	Holiday	Holiday	Holiday	Holiday	Holiday
17	402.000	44.750	25.500	172s. 3d.	35.000
18	402.000	(e)	(e)	(e)	35.000
20	402.000	44.750	25.500	172s. 3d.	35.000
21	402.000	44.750	25.500	172s. 3d.	35.000
22	402.000	44.750	25.500	172s. 3d.	35.000
23	402.000	44.750	25.500	172s. 3d.	35.000
24	402.000	44.750	25.500	172s. 3d.	35.000
25	402.000	(e)	(e)	(e)	35.000
27	402.000	44.750	25.500	172s. 3d.	35.000
28	402.000	44.750	25.500	172s. 3d.	35.000
29	402.000	44.750	25.500	172s. 3d.	35.000
30	402.000	44.750	25.500	172s. 3d.	35.000
31	402.000	44.750	25.500	172s. 3d.	35.000
	AVERAGES FOR MONTH				
Aug.	402.000	44.750	25.500	—	35.000
	AVERAGES FOR WEEK				
Aug. 1	402.000	44.750	—	—	35.000
8	402.000	44.750	—	—	35.000
15	402.000	44.750	—	—	35.000
22	402.000	44.750	—	—	35.000
29	402.000	44.750	—	—	35.000

Calendar week averages, New York Silver: Aug. 4th, 44.750; 11th, 44.750; 18th, 44.750; 25th, 44.750.

(e) Not quoted (Saturday).

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis, as noted. All prices are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.225c. per pound, the average differential for freight and delivery charges.

(b) Export prices are net at refineries on the Atlantic seaboard and include sales of domestic copper in the foreign market. Owing to the World War and the disruption of normal trade relations, our export copper quotations, since September, 1939, have been based largely on f.a.s. transactions, ex United States ports. We deduct .05c. from the f.a.s. basis (lighterage, etc.) to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c. per pound over the current market for Prime Western but not less than 1c. over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month.

Quotations for lead reflect prices obtained for common lead, and do not include grades on which a premium is asked.

(c) Silver other than newly-mined domestic, by Handy & Harman. Under Treasury order of July 6, 1939, the price on domestic newly-mined silver mined subsequent to July 1, 1939, was fixed at 71.11c. per troy ounce. Handy & Harman's quotation on newly-mined domestic silver 999 fine was 70⅝c. throughout August.

(d) U. S. Treasury's gold price. Actual payment by the United States Treasury for gold in domestic and imported ore or concentrate is at 99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

insufficient to disturb the general price level. The question of reducing purchases of foreign copper has come up, but definite action awaits a statement of official policy in reducing FEA's program. The stockpile of copper has increased to around 385,000 tons.

The supply-requirements picture in lead has improved and the industry believes that additional tonnages will be released in the near future for production of pigments. The stockpile of lead has increased from a low of 65,000 to 94,000 tons. The market for lead is viewed as strong.

Shipments of zinc in July totaled 51,909 tons, against 54,507 tons in June. Stocks increased to 197,004 tons. Demand for Prime Western was fairly active, but most of the other grades were quiet.

Quicksilver dropped sharply. The nominal quotation as August ended was $110 per flask, against $135 a month ago. Imports so far this year are estimated at 46,000 flasks.

Metallic manganese, 96 percent grade, was reduced to 30c. per pound, bulk basis.

Miscellaneous Metals Monthly Averages

Average prices of miscellaneous metals for July and August:

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average producers' and platers' quotations, (e) Special shapes sold to platers.

	July	Aug.
Quicksilver, N. Y. flask	140.720	123.200
Antimony (a)	15.839	15.839
Antimony, bulk, Laredo	14.500	14.500
Antimony, bulk, N. Y.	15.265	15.265
Antimony, Chinese (b)	16.500	16.500
Platinum, oz. troy	35.000	35.000
Cadmium (c)	90.000	90.000
Cadmium (d)	92.500	92.500
Cadmium (e)	95.000	95.000
Aluminum ingot	15.000	15.000

E & M J Price Index

Weighted index of non-ferrous metal prices (copper, lead, zinc, tin, silver, nickel, and aluminum). The average for the years 1922-1923-1924 equals 100.

1929	110.33	1937	90.86
1930	82.87	1938	73.67
1931	60.20	1939	77.71
1932	48.26	1940	79.22
1933	59.79	1941	83.49
1934	69.59	1942	86.80
1935	74.66	1943	88.74
1936	73.45	1944	88.74

	1943	1944	1945
January	88.74	88.74	88.74
February	88.74	88.74	88.74
March	88.74	88.74	88.74
April	88.74	88.74	88.74
May	88.74	88.74	88.74
June	88.74	88.74	88.74
July	88.74	88.74	88.74
August	88.74	88.74	88.74
September	88.74	88.74	....
October	88.74	88.74	....
November	88.74	88.74	....
December	88.74	88.74	....

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York, unless otherwise stated
(Sept. 1, 1945)

MISCELLANEOUS METALS

Aluminum, ingot, 99 plus per cent, lb.	15c.
Antimony, domestic, spot, lb., 5 tons or more	15.839c.
Bismuth, ton lots, lb.	$1.25
Cadmium, commercial sticks, lb.	90c.
Calcium, lb., ton lots, 97 @ 98 percent, cast	$1.85
Chromium, 97 per cent grade, lb.	89c.
Cobalt, 97 to 99 per cent, per lb.	$1.50
Indium, troy oz.	$3.00
Nickel, electrolytic cathodes, lb.	35c.
Magnesium, 99.8 per cent, carloads, lb.	20½c.
Palladium, troy oz.	$24.00
Platinum (Official quotation) troy oz.	$35.00
Quicksilver, flask of 76 lb., 100 flasks or more	$110.00
Selenium, 99.5 per cent, lb.	$1.75
Silicon, minimum 97 per cent, spot, carloads, lb.	14.75c.
Tellurium, lb.	$1.75 nom.
Thallium, 100 lb. or more, lb.	$12.50 nom.
Titanium, 96 to 98 per cent, lb.	$5.00

METALLIC ORES

Beryllium Ore, 8 to 12% BeO, f.o.b. mine, per unit	$10.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry 48% Cr_2O_3, 2.8 to 1 ratio	$41.00
48% Cr_2O_3 3 to 1 ratio	$43.50
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer	$4.75
Mesabi bessemer	$4.60
Old Range non-bessemer	$4.60
Mesabi, non-bessemer	$4.45
Lead (Galena) 80 per cent, Joplin, Mo., ton	$76.01
Manganese, Metals Reserve Co. sales price, per long-ton unit of Mn contained, 48 per cent, subject to premiums and penalties, effective May 15, 1944: 85c. (duty paid) New York, Philadelphia, Baltimore, Norfolk, Mobile, and New Orleans; 91c., Fontana, Calif., Provo, Utah, and Pueblo, Colo.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	45c.
Tungsten Ore, per unit of WO_3:	
Chinese, 60 per cent, duty paid	$24.00
Domestic, 60 per cent and upward	$24.00@$24.50
Vanadium Ore, per lb. of contained V_2O_5 f. o. b. mines	27½c.
Zinc Ore, Prime, 60 per cent concentrate, Joplin, Mo.; per ton	$55.28
(a) Prices at mines, small lots, normally several dollars less.	

METALLIC COMPOUNDS

Arsenic Oxide (arsenic) lb.	4c.
Cobalt Oxide, 70 @ 71 per cent, lb.	$1.84
Copper Sulphate, 100 lb.	$5.00

ALLOYS

Beryllium Copper, 2.5 to 3 per cent Be, per lb. of contained Be	$15.00
Ferrochrome, 65 @ 70 per cent per lb. of Cr contained	13c.
Ferromanganese, 78 @ 82 per cent, gross ton	$135.00
Ferromolybdenum, 55 @ 65 per cent Mo, lb. of Mo contained	95c.
Ferrosilicon, 50 per cent, per lb. of contained Si	6.60@8.10c.
Ferrotungsten, 75 @ 80 per cent, lb. of W contained	$1.90
Ferrovanadium, per lb. of V delivered	$2.70@$2.90
Silicomanganese, 1 per cent C, gross ton	$133.00

NON-METALLIC MINERALS

Asbestos, f.o.b. Canadian (Quebec) mines (U.S. funds), ton:	
Crude No. 1	$650@$758
Crude No. 2	$165@$385
Spinning fibers	$124@$233
Paper stock	$44@$49.50
Shorts	$14.50@$26.50
Vermont, f.o.b. Hyde Park:	
Shingle stock	$62.50@$65.00
Paper stock	$44.00@$53.00
Shorts	$14.50@$28.50
Floats	$19.50
Barytes, f.o.b. mines:	
Georgia, crude, per long ton	$8.50@$9.00
Missouri, 93 to 94 per cent $BaSO_4$, per short ton	$8.25@$8.50
Bauxite, long ton:	
Domestic, crude, 50 @ 52 per cent (not dried)	$5.00
Domestic, chemical, 55 @ 58 per cent	$7.50@$8.50
Domestic, abrasive, 80 @ 84 per cent	$16.50
China Clay, f.o.b. mines, ton:	
South Carolina and Georgia, No. 1, bulk	$6.75@$8.00
Delaware, No. 1	$15.00
Feldspar, bulk, ton:	
Potash feldspar, 200 mesh	$17.00
Glass spar, white, 20 mesh	$11.75
Fluorspar, f.o.b. mines, bulk, Kentucky and Illinois 60 per cent, all rail movement, ton	$30.00
Acid 98 and 1 per cent, bulk, ton	$37.00
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00@$14.00
Magnesite, per ton dead-burned, f.o.b. Washington	$22.00
Mica — Colonial Mica Corp., agent for Metals Reserve Co., quotes full-trimmed ruby muscovite domestic, April 1 to Sept. 30, inclusive — No. 1, $1.70 to $36.65 per lb., depending on size; No. 2, $1.25 to $26.00; No. 2 Inferior, 50c. to $16.00; No. 3, 25c. to $6.25. Prices f.o.b. nearest producer's rifting plant.	
Ocher, Georgia, ton	$19.00@$22.00
Pyrites, Spanish, per long ton unit of S, c i f. Atlantic ports	12c. nom.
Silica, in bags, 325 mesh, ton	$20.00@$40.00
Sulphur, Texas, mines, long ton	$16.00
Talc, f.o.b. works, ton:	
New York, double air-floated, 325 mesh	$12.00@$15.00
Vermont, extra white, 200 mesh	$9.50@$10.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$14.50

IRON AND STEEL

Pig Iron, Valley furnaces, gross ton: Basic	$24.50
Steel, base price, Pittsburgh Billets, gross ton	$36.00
Structural shapes, 100 lb.	$2.10

WASHINGTON REFLECTIONS

McGRAW-HILL WASHINGTON NEWS BUREAU

Government Drops Controls To Hasten Reconversion

Japan's sudden collapse upset the plans for the reconversion of this country's economy. The broad over-all master plans were well conceived and ready, but the details had not been worked out. This was evident to those on the scene in Washington. Nevertheless, Administration leaders handling reconversion moved forward boldly, even spectacularly, on the morning following the President's announcement of Japan's capitulation.

John W. Snyder, Director of Reconversion, led off with a report to the President entitled "From War to Peace—a Challenge." In his letter of transmittal, he stated that the report was "designed to answer the specific questions which will be uppermost in the minds of the people now that Japan has been finally crushed."

The answer to the challenge, said Mr. Snyder, is production. The Administration's program, with which no one can disagree, was given by the reconversion director in the following words:

"The goal of our economy now that peace has come is in a sense the same as it was in war: production.

"Only a peacetime production, vastly expanded over anything this or any other nation has ever seen, will make possible the attainment of the four major economic objectives which face us in the months ahead. These objectives I conceive to be:

"1. Jobs for all those willing and able to work.

"2. A steadily rising standard of living.

"3. Stabilization of our economy to avoid disastrous inflation or deflation.

"4. Increased opportunities for farmers and business men."

J. A. Krug, War Production Board chairman, followed immediately with a report on WPB's plans for V-J Day and a discussion of the moves that would be the board's part in carrying out the Snyder program.

Mr. Krug stated to newsmen, just as he had done frequently in the past, that WPB plans were primarily to get restrictions out of the way and then "to stand aside to let industry do its stuff." He explained to newsmen that industry had been controlled by about 650 WPB orders on V-E Day. These had been reduced to approximately 400 on V-J Day and by the beginning of the first week after the President's announcement of the Japanese surrender, wholesale revocation of orders would be made that would leave only 30 or 40 on the books, by which the few materials that remained in short supply would be distributed and production bottlenecks controlled. Some of the more important points of WPB's plan are:

"1. All but a handful of orders will be cancelled within a few weeks.

"2. Release of a huge industrial building program through a plan to relax industrial construction controls. This plan, designed to absorb the manpower and materials freed by military cutbacks, is already in effect, and additional relaxation will be considered within thirty days.

"3. Remove ceilings on production of automobiles and other consumers' durable goods. These important industries may now move forward with all-out production programs.

"4. Orders controlling materials that are still in short supply, tin, crude rubber, textiles, lumber, etc., will be retained until shortages ease or until there is no longer any danger of a scramble.

"5. Inventory controls will be retained until the danger of hoarding, pre-emptive buying and stockpiling by the few at the expense of the many are over.

"6. Preferential protection of small business ($50,000 or less per quarter), including the rating system, will remain in effect for the time being until the effects of cutbacks can be appraised and it is safe to remove them.

"7. WPB will retain its powers for breaking bottlenecks or giving protection where needed to military or highly essential civilian or export needs. These powers will be used only where necessary, and business should not rely on priorities help for conducting its normal activities.

"8. In line with the President's letter to the WPB chairman, the board will take vigorous action to expand production of materials which are in short supply to meet civilian demands and will work with OPA, WMC, and other agencies whose operations are of equal importance to the rapid expansion of such production."

WPB expects to abandon priorities, CMP and production scheduling Sept. 30, 1945—i.e., at the beginning of the fourth quarter. At that time only an MM rating will be in effect "to protect the remaining military procurement." WPB also will retain authority to give special assistance for military, emergency civilian, or export needs if and as necessary.

General Scheduling Order M-293 will be retained ready for instant use. Most of the tables will be revoked immediately, but frozen delivery schedules will be retained in effect until the end of September.

The rest of the WPB order structure will be thrown out at once except those conservation orders which control materials in seriously short supply. The shortage must be expected to remain some time into the future, as in the case of tin, if control over the use of the material is to be retained.

General inventory controls will be kept in effect as long as needed. They even may be strengthened to prevent speculative buying such as occurred after the first World War.

Materials will be retained on the list of commodities controlled by the General Imports Order M-63 only if "(a) the commodities were under Combined Raw Materials Board allocation and M-63 was necessary to implement such allocation, (b) uncontrolled private import would have interfered with the special purchase programs of FEA, (c) uncontrolled private import would have interfered with the production and procurement of essential commodities, (d) the use of M-63 was necessary to conserve shipping space or (e) there was a special reason peculiar to the commodity requiring its retention on M-63. There is some question as to how long international CRMB allocations of scarce materials will continue.

Paragraph 22-C of the Surplus Property Act now controls the disposition of Government stocks. WPB's Committee on Period One explained in its report that, "Stockpiles of Government-owned materials accumulated for protection against interruptions of supply for the Japanese war are no longer necessary for that purpose. Their disposition is already controlled by the Surplus Property Act and the provisions of Paragraph 22-c of that Act are now being carried out by the War Production Board in estimating the six months' deficiency in requirements for production for other than war purposes. Proposed legislation for postwar stockpiling may provide for public purchase of raw materials, but this responsibility at present does not appear to be within the scope of the WPB's authority."

FEA's Metal Program Hinges on Policy Action

A definite statement on policy regarding the Government's purchases of foreign copper and other war metals was unobtainable in Washington as August ended. One was expected, however, because unconfirmed reports to the effect that the Foreign Economic Administration had served notice on foreign producers that contracts were to be terminated

after October caused widespread speculation and confusion on what is viewed as a delicate operation. Ceiling prices, import tariffs, and shattered foreign markets all enter into the picture. A substantial percentage of our total supply of copper, lead, and zinc in the war period originated abroad.

During the last half of August FEA gave every appearance of jockeying to obtain a firm order from some high authority, preferably the White House, to continue foreign purchases. A directive to do so would forestall later criticism. Until policy has been set, sources close to that organization say that contracts for the purchase of foreign metal are being allowed to expire and in some cases are being cancelled. In instances where materials are definitely scarce, as in tin, purchases are expected to continue, though perhaps on a modified pricing basis. Unofficially, the policy seems to be one of getting out from under as rapidly as possible.

It is known that firm contracts into which the Government has entered will be completed. Contracts have been written for shorter and shorter periods as the end of hostilities could be seen, and during the last year most commitments were closed on a three-months' basis. Some, of course, have been written with bail-out clauses.

Ickes Turns Down Indian Claims to Alaska Lands

The decision of Secretary Ickes on claims of the Alaskan Indians for ancestral possessory rights recognized the Indians' claims only to 273,000 acres, about 8 percent of the total sought. The Secretary rejected completely the Indians' petition for exclusive rights to certain ocean waters in which valuable salmon fisheries are now established. The hearings had been manipulated so that any kind of a finding was possible. Apparently, with his continuance in office very much in doubt anyway, the Secretary decided that his power-hungry associates had thrown him too hot a potato to be handled.

The land now will be open to exploration, and literally thousands of young men who have heard about the resources of Alaska are asking the Government for information regarding the procedure they must follow to take up claims. Many of these are discharged soldiers who, for the most part, have not been in Alaska. Friends of the Territory are afraid that many of the uninitiated will have a hard time and that their experience will have a detrimental effect on the normal development of the country.

Big mining enterprises are showing interest in the area and are sending qualified men to search for commercial deposits.

Five principal points in the decision of the Secretary of the Interior were given in the official announcement. These points are as follows:

"1. Rejects the claims of natives of Hydaburg, Klawock, and Kake to exclusive possession of lands aboriginally occupied as to approximately 92 percent of the areas claimed, and upheld claims to the remaining 8 percent which consists of lands adjacent to the native villages which have been continuously and exclusively occupied by the natives since May 17, 1884;

"2. Rejects the claims of the natives of the three villages to exclusive possession of ocean waters;

"3. Allows claims with respect to the right to hunt, fish, trap, and gather wild produce in common with other persons in the greater portion of the area claimed so long as such areas remain in public ownership;

"4. Recognizes that where native occupancy has been continuous and exclusive in certain beaches, submerged lands, inland waters, and bays adjacent to lands continuously and exclusively occupied, such use and occupancy is protected by law;

"5. Concludes that the policy of recognizing aboriginal possessory rights where native possession has been continuous and exclusive applies as well in Alaska as in the States of the Union."

Monetization of Silver Will Exhaust Idle Stocks

Gradual monetization of 300,000,000 oz. of silver will about exhaust idle stocks in the hands of the Government, a spokesman for the Treasury said last week. This action will make possible the issuance of $387,000,000 in silver certificates. The metal was acquired at the market, or substantially below the monetary value of $1.29 an ounce troy.

The Treasury owns about 700,000,000 oz. of silver, of which approximately 400,000,000 oz. is being utilized temporarily in war industries or has been loaned to other governments.

Tin, Lead, Antimony May Remain Short

The end of the war has made almost all materials plentiful. However, there are a few metals which will remain under strictest allocation. Tin heads the list.

Government control over the distribution and use of tin is expected to continue long after control of other metals has been dropped. No estimate of when this will happen can be made until it is known when the tin mines of the Far East can be brought into operation and if there are any stocks of tin that can be exported promptly.

Even while preliminary negotiations for Japan's surrender were going on, the critical tin shortage was highlighted by new restrictions permitting uses of this vital metal. The new restrictions limit producers of all tin alloys to the amount of their quotas in any calendar quarter. Formerly quotas could be exceeded if a producer's inventory would permit it. Producer's inventories of tin alloys have been limited to thirty days' supply.

The Washington view is that lead probably will remain tight throughout next year, even with imports. Importation of lead is necessary, as domestic production cannot meet current demands in this country. The situation may become complicated if the ceiling price in this country remains at its present level and the price in foreign countries rises. Imports will then stop unless the Government purchase program remains in effect or the Combined Raw Materials Board survives and allocates a sufficient amount to the United States.

Antimony is the third of the nonferrous metals which will remain under WPB control. The trouble is a shortage of metal, not a shortage of ore. There is a possibility that the problem of antimony supply may be cleared up promptly if it is found that the 17,000 tons which China was supposed to have stockpiled as security for our bank loans actually is available. If that metal could be brought to this country, the shortage of antimony would be over. Also, the metal supply may be increased if smelting capacity now devoted to oxide production becomes available for metal. Heavy military demands for the oxide, to be used for flameproofing of materials, are being severely cut back.

Budget Balancing Will Hamper Tax Relief

Acceptance in official circles of the idea that the Federal budget is to be balanced is a new note in Washington which will temper tax revision. The Congressional ax will be swung violently for display purposes, but cuts in tax rates will be moderate, in the opinion of many tax experts.

Work on a new revenue bill is scheduled for both houses of Congress as soon as it reconvenes. It is the hope of leaders that a revision of the present tax structure may be passed before the end of the year. Cuts in corporate and individual income taxes are expected. The excess-profits tax and some, if not all, of the "nuisance" excise taxes are to be repealed, if statements recently made by members of Congress are to be taken at their face value.

Experts warn that a decline in business activity because of cancellation of war contracts and the pause for reconversion may reduce income too far to permit sharp reductions and also balance the budget before 1947. Some believe the country will be doing well if it is able to achieve a balance by 1950.

NEWS OF THE INDUSTRY

U. S. Steel to Expand California Steel Operations

Discontinuing all further efforts to acquire the Government-owned steel plant at Geneva, Utah, the United States Steel Corporation has authorized a large expansion program at its West Coast operating subsidiary, the Columbia Steel Co., according to an announcement by Benjamin F. Fairless, president of United States Steel, on Aug. 8.

Included in the modernization program will be the installation of cold reduction equipment at Pittsburg, Calif., having an annual capacity of 325,000 tons of sheet and tin-plate. Cost will be approximately $25,000,000. Modernization of Columbia's installations at Torrance, Calif., is also being considered.

Mr. Fairless stated that upon investigating the feasibility of acquiring the $200,000,000 Geneva plant, conditions prescribed by D.P.C. and the Surplus Property Board practically ruled out United States Steel as a prospective lessee or purchaser.

If D.P.C. or the future operators of the Geneva plant decide to manufacture hot-rolled coils there, Mr. Fairless announced that United States Steel would negotiate for purchase of a substantial amount for production at Pittsburg, Calif., provided the coils would be produced at Geneva concurrently with Columbia's expanded operations.

During a recent Washington visit Governor Maw of Utah said that President Truman promised assistance in keeping the Geneva plant operating in the postwar era. Attorney General Clark and Sam H. Husbands, president of DPC, also wish to keep the plant in operation, he stated. The Utah Governor plans to organize a State committee to aid in securing a plant buyer.

RFC Increases Loan On Kaiser Fontana Plant

The Reconstruction Finance Corporation has announced an $11,500,000 increase in the loan to the Kaiser Companies, Inc., for improvement and expansion of the steel plant at Fontana, Calif.

Total indebtedness will be revamped, and RFC will take a 15-year 4 percent first mortgage of $69,500,000, which represents $58,000,000 sound money value of the present fixed assets plus improvements and additions; a 25-year second mortgage for $34,510,380 without interest, representing the balance of the original loan invested in fixed assets; and a $10,315,000 note secured by 103,180 shares of 4 percent first preferred stock of Kaiser Co., Inc., having a par value of $100 per share.

All net profits received by the Kaiser company for ship construction will continue as security for the revamped loan. So far, approximately $14,000,000 has been paid RFC from shipbuilding profits. Of this amount $9,000,000 was applied to the principal of the original loan, and the balance to interest.

Industrial engineers estimate that the plant should earn $5,000,000 annually exclusive of depreciation and income tax if operated at 60 percent capacity, and $10,000,000 if operated at 80 to 100 percent capacity.

Kaiser Objects to Plan

Discussing the revised loan, Henry J. Kaiser stated on Aug. 23 that his organization would endeavor to use the mortgage readjustment plan regardless of whether it is "fair or unfair," adding that the plan certainly disbarred the West from enjoying lower steel prices.

Mr. Kaiser pointed out that RFC consulting engineers, in estimating future earnings, assumed that Fontana would market its steel at the full limit of differential price prevailing, which is contrary to Western hopes that this differential will be reduced. "This assumption is required by the nature of the adjustments that are allowed by RFC on Fontana's capital debt," his statement pointed out.

RFC's adjusted $69,500,000 first mortgage "factors out as a bonded debt of $92.56 per ton of ingot capacity at Fontana, nearly 12 times bigger than the average $7.60 per ton debt of the steel industry," he said, adding that to service and amortize this mortgage, Fontana must earn fixed charges of more than $7 per ton of ingot capacity, or twice the total earnings of the steel industry.

The second mortgage and note totaling over $44,000,000 represent excess costs above sound values, he said, and must therefore include the war costs incurred by Fontana's record construction under wartime conditions.

NEWS BRIEFS

U. S. Spends 4 Millions on Jersey Mines. The Senate War Investigation Committee reported that the Government spent $4,000,000 on iron mines at Ringwood, N. J., and then withdrew support before production started. The Alan Wood Steel Co. was placed in charge of construction and operation by DPC. WPB rejected Alan Wood's request in 1944 for an additional $384,300 to finish the project because the mines were considered to be no longer essential to the war program. Representative Thomas, of New Jersey, has protested against closing the mines and dismantling the plants.

Uranium Exploration. Hon. C. D. Howe, Minister of Munitions and Supply, has announced the use of 20 Government prospecting parties in exploring the area near Great Bear Lake, N.W.T. All rights to radioactive ores will revert to the Crown.

1947 Manufactures. Reports to the Committee for Economic Development indicate American manufacturers plan to produce goods worth $80.5 billion in 1947, compared with production of $56.8 billion in 1939, both figures being at the 1939 price level. It is estimated that 13,469,000 workers will be required to produce the 1947 output, and that total civilian employment in 1947 may be about 53,448,000.

Canadian Institute Meets. The annual Western Meeting of the Canadian Institute of Mining and Metallurgy will be held in Edmonton, Alberta, Oct. 15 to 17. The British Columbia Division of the Institute will meet in Vancouver, Oct. 24 to 26.

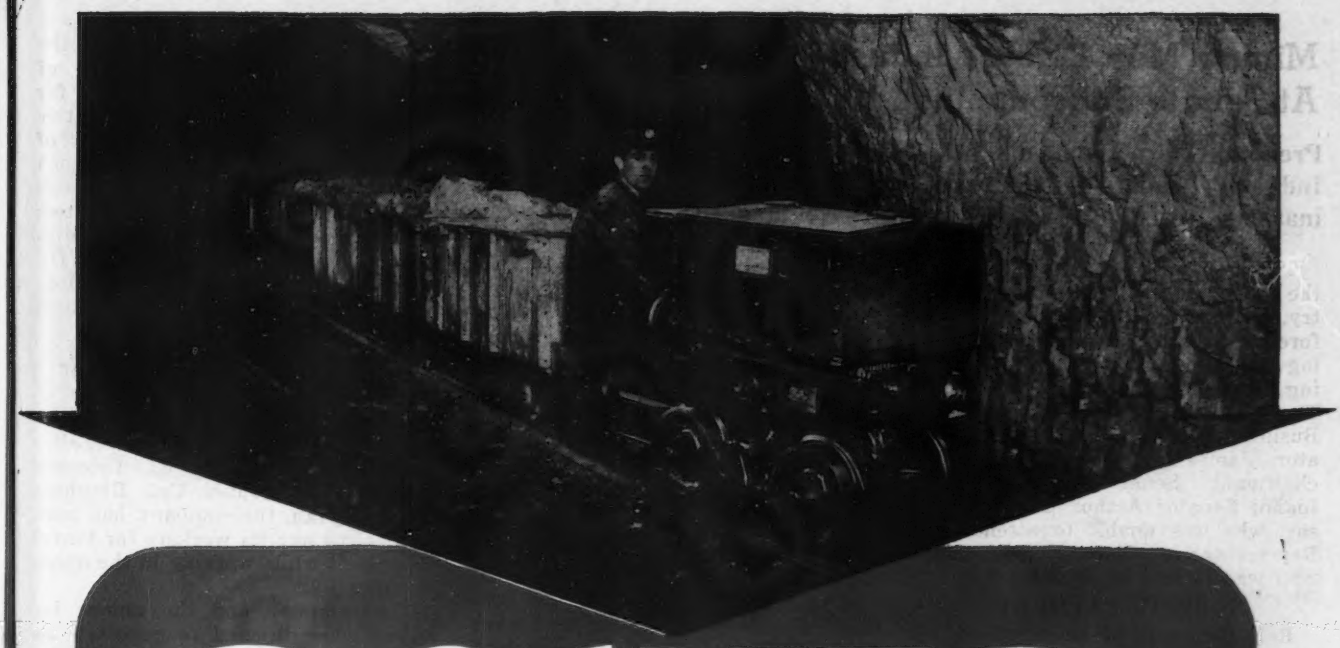
Nation Advised to Conserve Open-pit Iron Reserves

Conservation of a major part of high-grade iron-ore reserves to safeguard the United States against future wars was recommended to the War Production Board by W. R. Van Slyke, a mining engineer of long experience on the Mesabi Range of Minnesota, who proposed the following steps:

1. Acquire absolute control of 300,000,000 to 400,000,000 tons reserve of high-grade, open-pit ore in the Minnesota Mesabi Range and the Lake Superior iron district, maintaining a third to a half for instantaneous production.

2. Raise present iron-ore values at the mines by at least one dollar per ton to permit economic mining of underground ores and the beneficiation of various low-grade ores, including taconite, to offset curtailed open-pit operations. This can be done either

(*Continued on Page* 156)



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Mining Men Discuss Industry Problems At Senate Subcommittee Hearing in Montana

Premium Price Payments Advocated by Labor but Questioned by Industry Leaders—Gold Producers Criticize Government Discrimination—Revision of SEC Rules Is Recommended

The premium price plan, SEC rules, the status of the gold mining industry, and the tariff were discussed before the Senate Subcommittee on Mining and Minerals, which held a hearing at Helena, Mont., Aug. 7 and 8. The subcommittee of the Senate Small Business Committee consisted of Senator James E. Murray, Montana, chairman; Senator Glen Taylor, Idaho; Senator Arthur Capper, Kansas, who was unable to attend; and Representative Clair Engel, Calif., who was invited to attend.

SUBSIDY PAYMENTS

Reid Robinson, president of the International Union of Mine, Mill and Smelter Workers (CIO), recommended postwar premium price payments on metals at high-cost mines, stating that subsidies are more favorable to world trade than high tariffs.

Although the premium price plan was originally adopted to encourage production, Mr. Robinson contended that a similar plan should be adopted now as a conservational measure and to insure utilization of known ore reserves. "In cases where important quantities of reserves would be lost through shutdowns," he said, "we propose that the Government provide conservation payments to prevent such shutdowns." As such payments would be made only to specified mines, he reasoned that the cost to the consumer would be less than if tariff protection were extended to high- and low-cost producers alike.

Henry L. Day, manager of eight producing mines near Wallace, Idaho, questioned the value of the subsidy plan as practiced, pointing out that small new enterprises had received "very good consideration from the quota committee, while old, established operations had been discriminated against." Subsidy payments should be established, he suggested, by computation of past performance of individual mines, rather than on forecasts of production and costs for subsequent periods.

Donald A. Callahan, Wallace, Idaho, objected to the continuation of subsidies because they necessitate further control and concentration of power in Washington and make the interests of small mines subservient to the Government.

Subsidies in peacetime were opposed by Otto Herres, vice-president of Combined Metals Reduction Co., Salt Lake City, who asserted that the "industry does not want to go on a government dole." He recommended a high tariff to bar undesirable foreign competition.

Western operators submitted a resolution through Robert S. Palmer, secretary of the Colorado Mining Association, urging the following points: (1) Establish a $45 per ounce price for domestically produced gold. (2) Make it contrary to public policy to issue official statements or orders discriminating against the gold-mining industry. (3) Take immediate steps to place gold in circulation. (4) Enable the employment of labor in the gold-mining industry now.

WPB was accused of having "discriminated" against the gold producers by having denied them low preference ratings. In answer to charges that WPB had granted equipment priorities to tombstone manufacturers while similar requests had been denied gold producers, F. W. Christiansen, representative of WPB, stated that evidently policy makers on the board considered gold mining less essential than the manufacture of tombstones.

Concurrently with the meeting, the Senate subcommittee released a report indicating that gold mining should not be classed as non-essential to the civilian economy, stating that "The need for increased gold mining is shown by the obvious lack of sufficient gold to handle domestic world trade. A large industrial need has also developed. The Bureau of Mines reports that gold to the value of $96,864,000 was issued for industrial uses in 1943, and this exceeded the value of production from the mines of the United States and Alaska for the same year by $49,130,000.

SEC REVISIONS

A need for changes in SEC regulations was stressed by Carl J. Trauerman, secretary of the Mining Association of Montana, to free small mining operations from governmental paternalism and permit the financing of mines through private capital. He objected to an SEC ruling on the determination of methods for the valuation of mine properties and to the present requirement that a statement of a mine's financial standing must be presented on the first page of the prospectus offering stocks for sale.

Owen H. Perry, of Perry-Schroeder Mining Co., Helena, Mont., contended that Federal loans were satisfactory for equipping mines for production but should not be used for mines in the exploratory stage. Instead, he recommended that SEC rulings be revised to expedite the sale of stock to private investors for exploration.

Others who took part in the hearing included Harry W. Marsh, secretary of the Idaho Mining Association; Frank Lilly, of the Northwest Mining Association; S. H. Lorain, chief of the Albany division, U. S. Bureau of Mines; Frank Kuehl, attorney for RFC; Jesse H. Maury, representative of the premium metals division of OPA; William C. Broadgate, Arizona mining engineer and technical consultant for the Senate subcommittee; Robert Porter, president of the Mining Association of Montana; and Dr. Francis A. Thomson, director of Montana Bureau of Mines and Geology.

WLB Directs Utah Copper To Pay Travel Time

In a decision of the War Labor Board affecting some 1,700 employees of the Utah Copper Co., Bingham Canyon, Utah, the company has been directed to pay its workers for travel time spent while working in the open-pit mine.

The company and the unions involved were directed to negotiate as to (1) the amount or method of determining the amount of travel pay; (2) designate points for going on and off duty; (3) rates or ranges of payment for travel pay, and (4) any other related issue.

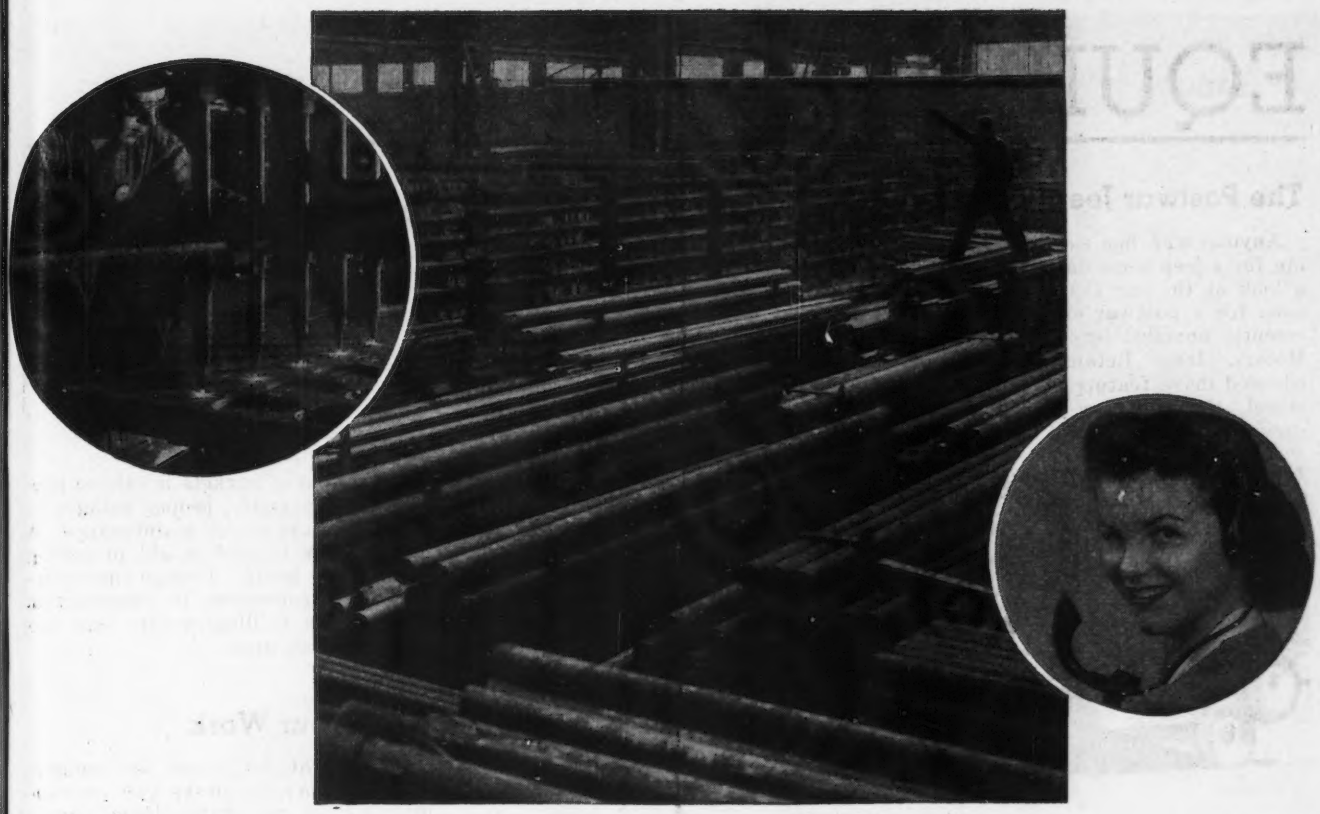
The board's action parallels a previous decision involving the Kennecott Copper Mines, Santa Rita, N. M., which directed payment for travel time and also left the amount and method for determining the amount to be negotiated by the company and unions.

Western Leasers Object to Non-payment for Uranium

Complaints of leasehold and independent miners regarding non-payment for uranium content of carnotite ores purchased by or through U. S. Vanadium Corporation and Vanadium Corporation of America in western Colorado and eastern Utah constitute one of the reasons for a current grand jury investigation going on out of Denver regarding possible anti-trust violations by the two companies.

The "United Mine Workers District 50 News" charges that the independent miners and leaseholders had not received any return for uranium content which increased the value of the ores they produced.

J. L. Robison, general superintendent of U. S. Vanadium Corporation, Uravan Colo., stated: "The company has nothing to hide, apologize for, or explain. We are in the business of refining and producing vanadium, and purchased ores on that basis. The sliding scale of price is dependent on vanadium content—not uranium—and we have in all cases paid that price fairly and honestly. We are not in the uranium business and do not have any interest in the metal. As everyone knows, there is no general market for it, and except for government demand, no use except to stockpile it."



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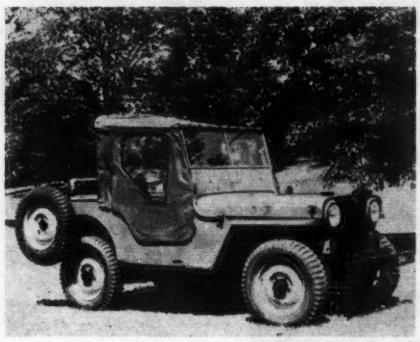
EQUIPMENT NEWS

The Postwar Jeep

Anyone who has expressed a longing for a jeep some day can now have a look at the car that will be available, for a postwar civilian jeep was recently unveiled by Willys-Overland Motors, Inc. Retaining the four-wheeled drive feature of the military model, the new car has undergone some changes to adapt it to peace-



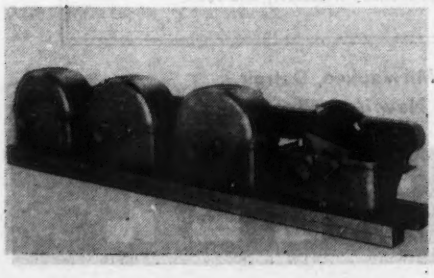
time use. As a result, the civilian jeep can be used as a tractor, a light truck, a power source (through a built-in take-off), or a passenger car with a top speed of 60 m.p.h. Springs and shock absorbers have been improved for civilian use. The only question (price fully equipped will be about $1,500) is: will the jeep ever replace the burro? Ans.: In the field, perhaps, but not in our hearts.

Metering Hot Water

Water up to 250 deg. F. in temperature can be metered by an instrument called the Propelloflo Meter now offered by Builders-Providence, Inc., Providence, 1, R. I. Useful where a simple totalizing meter is desired, the new instrument makes use of a special high-temperature grease for efficient lubrication.

One Unit, Many Reagents

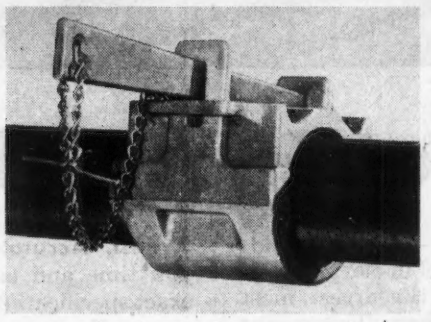
Centralizing the point of distribution of reagents for chemical and flotation processes is easily accomplished by means of an instrument such as the multicompartment reagent feeder recently announced by



Denver Equipment Co., 1400 Seventeenth St., Denver, Colo. Using but one motor to drive the feed disks in several compartments, the unit provides a flexibility in reagent distribution that is in keeping with developments in flotation technique. Each compartment can be regulated independently. Special feeders for corrosive liquids or for reagents that require heating can be supplied. The unit is described in the company's Bulletin F6-B6.

To Couple Pipes Quickly

A device to join plain-end pipes rapidly and without special tools is offered by Drinkwater, Inc., 2323 South Michigan Ave., Chicago, Ill. Making use of wedge keys to tighten the bond, the new coupling can be ap-



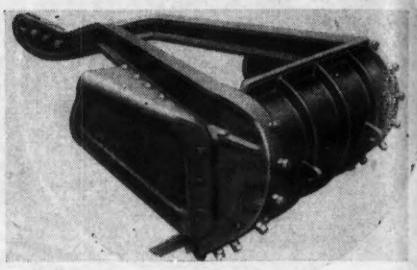
plied with no tool but a hammer. Neoprene, synthetic, and natural rubber gaskets are available, and the coupling allows up to 40-deg. flexibility at each joint. Called the Presto-Lock coupling, the unit comes in 11 sizes between 1¼-in. and 16-in. pipe, but because of military demands only the 3-in. and smaller sizes are now available.

Welders' Note

A-C nickel manganese, A-C Mo-Mang manganese, X-2, and X-3 electrodes are new additions to the Allis-Chalmers arc welding electrode line. Used for rebuilding or repair of worn equipment, the first two electrodes furnish a deposit that can work-harden to 550 Brinell. The X-2 electrode is used to hard-surface parts subjected to severe abrasion and mild impact; the X-3 protects against severe impact and mild abrasion.

Buckets for Scrapers

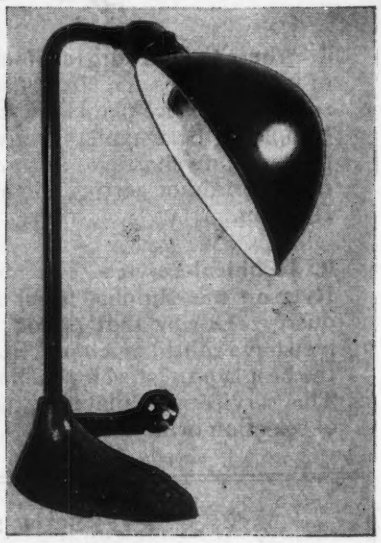
Two new types of buckets for use with scraper loaders were recently announced by the American Manganese Steel Division of American Brake Shoe Co., Chicago Heights, Ill. Made in two styles, the ¼- and the ¾-box,



the new line of buckets is said to provide high capacity, proper balance in operation, and easier maintenance. A curved back is said to aid in rolling up capacity loads. Though the scrapers differ somewhat in construction (the ¾-box is illustrated), both are of manganese steel.

Light Your Work

Good light for work at machine tools, benches, or desks can be supplied by an adjustable lamp known as the Work Lite, an improved model of which was announced recently by the Swivelier Co., 30 Irving Place,



New York, 3, N. Y. The new unit comes equipped with Greenfield cable and leads ready for direct attachment to outlet box or transformer. Several styles and sizes are available.

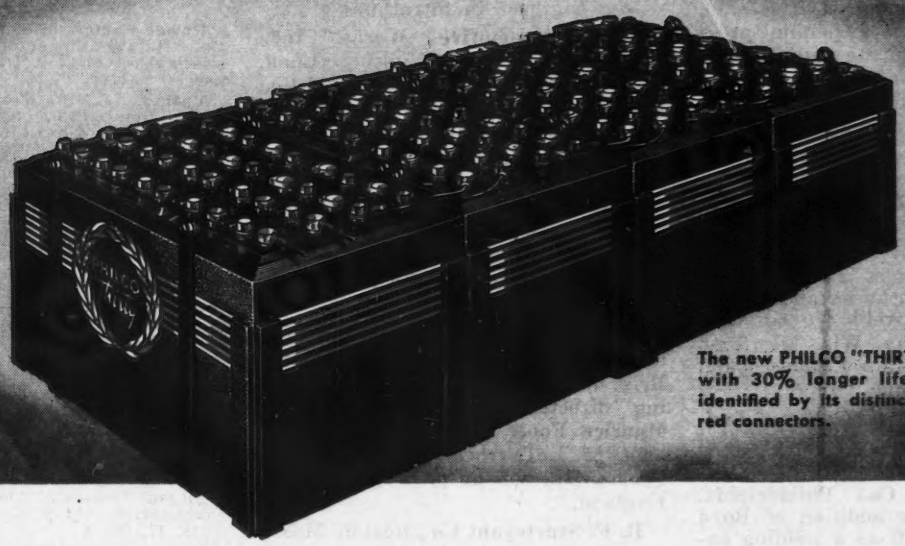
Diamond-drill Bits

Improved design that is said to result in more hole in less time is described by Sullivan Machinery Co., Michigan City, Ind., in announcing its new line of "Sul-Set" diamond drill bits. The cutting face of the new bit is molded into a series of ridges into which small diamonds are sin-

(*Continued on page* 112)

FOR THE LATEST IN
MODERN MINE BATTERY DESIGN . . .

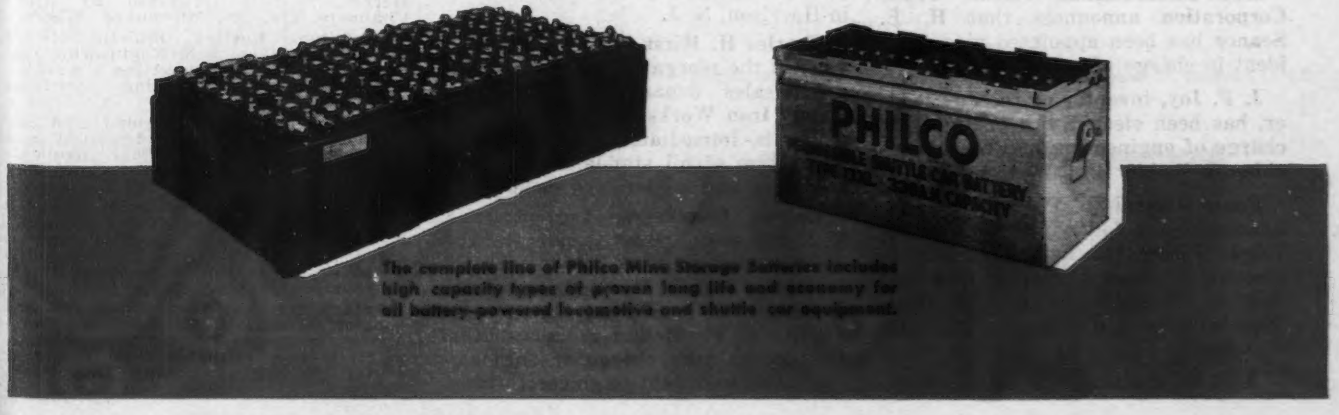
Specify PHILCO



The new PHILCO "THIRTY" with 30% longer life is identified by its distinctive red connectors.

MORE THAN EVER, today, Philco stands out as the leader in the development of modern high capacity, long-life storage batteries for mine haulage. Well known to mine operators is the pioneering work of Philco with its famous extra capacity XL and XVL type Batteries. And now, in addition, the great new Philco "Thirty" with 30% longer life, is available in increasing quantities for current deliveries. Powered by modern Philco Batteries, your locomotives and shuttle cars haul more tons. Philco dependability and longer life save you money. Write today for new descriptive catalogs. PHILCO CORPORATION, *Storage Battery Division,* Trenton 7, New Jersey.

For 50 years a Leader in Industrial Storage Battery Development



The complete line of Philco Mine Storage Batteries includes high capacity types of proven long life and economy for all battery-powered locomotive and shuttle car equipment.

(*Continued from page* 110)

tered. The valleys between the ridges thus serve as water ways, through which a rapid flow of water speeds up removal of drill cuttings, thus permitting the bit to remain in contact with uncut material. The new bit is said to be cooler in operation, thereby lengthening its life. Four bit sizes, a reaming shell, and a special coal bit are available. Ask for bulletin, D-33.

Diesel Nozzle Tester

Designed for use with all popular makes of diesel engines, a new model Universal nozzle and injector tester is now manufactured by the Buda Co., Harvey, Ill. With this portable unit, any mechanic or operator, it is said, can measure injector opening pressures, secure accurate adjustment, check uniformity of spray pattern, and detect other irregularities. Details will be furnished by the manufacturer.

INDUSTRIAL NOTES

Fred M. Sime and **W. J. Brett** have been appointed district sales managers for the Pacific southwest and Pacific northwest, respectively of the **Macwhyte Co.**, Kenosha, Wis. Mr. Sime will be located in San Francisco and Mr. Brett in Portland, Ore.

Guilford Duncan, president of **Ludlow-Saylor Wire Co.**, St. Louis, died May 9 at the age of 67.

Foote Mineral Co., Philadelphia, Pa., announces the addition of **Boyd E. Cass** to the staff as a welding engineer to render technical service to industry.

B. E. Lease has been elected president of **Athey Truss Wheel Co.**, Chicago, succeeding the late **C. Kier Davis.**

J. F. Geary, consulting engineer, has opened an office for design of plants and equipment for the process industries at 704 South Spring St., Los Angeles 14, Calif.

W. O. Bates, Jr., vice president of Caterpillar Tractor Co., is now manager of the Caterpillar branch at San Leandro, Calif.

Mack-International Motor Truck Corporation announces that **H. E. Seanor** has been appointed vice president in charge of export sales.

J. F. Joy, inventor of the Joy loader, has been elected vice president in charge of engineering of **Federal Machine & Welder Co.**, Warren, Ohio.

Foote Mineral Co., Philadelphia, Pa., announces the following changes: **Dr. Edgar Pitzer** has been promoted to director of research; **Donald B. Alnutt** will be assistant director; **V. Dale Martin** joins the company as sales director.

Axel W. Hedberg has been appointed works manager of **Marion Steam Shovel Co.**

C. G. Willard has been appointed manager of the **Marcy Mill Division of Mine & Smelter Supply Co.**, Denver, Colo. Mr. Willard has been with the company for 27 years.

Hercules Powder Co.'s Explosives Department announces that **William C. Hunt** is now assistant general manager and **Harry V. Chase** succeeds him as director of operations.

William R. Manske has been appointed works manager of the Denver, Colo., plant of the **Amsco Division of American Brake Shoe Co.**

Charles L. Bryden, filtration engineer, formerly with Infilco, Inc., Chicago, Ill., is now associated with **Bowser, Inc.**, Ft. Wayne, Ind., as research engineer in filtration.

Lima Locomotive Works, Inc., Shovel and Crane Division, Lima, Ohio, and **Michigan Power Shovel Co.**, Benton Harbor, Mich., jointly announce the appointment of **Hugh H. Buchanan** as director of foreign operations for both concerns.

E. G. Cross has recently been appointed supervisor of production, planning, and control at the Crocker-Wheeler division of **Joshua Hendy Iron Works**, Ampere, N. J.

R. G. LeTourneau, Inc., is planning to build a branch factory in England. **Brig. W. E. R. Blood** is to be managing director of the new branch; **Maurice Foote**, formerly superintendent of LeTourneau's Plant No. 1, Peoria, Ill., will be plant manager in England.

B. F. Sturtevant Co., Boston, Mass., manufacturer of air handling and processing equipment, has been acquired by **Westinghouse Electric Corporation**, and will be operated hereafter as a division of that company.

Cutler-Hammer, Inc., Milwaukee, Wis., announces appointment of **F. A. Wright** as assistant general sales manager. He has been with the company since 1927.

Harry A. Feldbush, formerly works manager of the Holyoke, Mass., plant of **Worthington Pump & Machinery Corporation**, has been named vice-president in charge of engineering for the entire company with headquarters in Harrison, N. J.

Charles H. Hirst is the new supervisor of the reorganized mining equipment sales department of **Joshua Hendy Iron Works**, Sunnyvale, Calif., which is immediately resuming full production of all standard lines with improved and modernized designs.

Robins Conveyors, Inc., Passaic, N. J., has reorganized its sales department, which continues under the direction of **Harold Von Thaden. E. C. Salzman** will handle all export operations; **J. F. Meissner** moves from Chicago to take charge of engineering sales and field engineers; equipment sales will be under **A. E. Conover; T. W. Matchett** will handle research and training; advertising and sales promotion remain under **E. W. Perrin.**

Michael J. Sasgen, Chicago manufacturer of industrial equipment and tools, died on July 27, 1945.

BULLETINS

Skips and Cages. Lake Shore Engineering Co., Iron Mountain, Mich., announces publication of a 16-page catalog on mine skips and cages, including detailed descriptions of 13 types of skips and 7 different cages.

Excavating Equipment. Bay City Shovels, Inc., Bay City, Mich., has published a new catalog of Bay City excavating and materials-handling equipment that will be available for postwar use.

Hydraulic Jacks. Users of lever and hydraulic jacks should be interested in the 48-page repair and maintenance catalog just published by Templeton, Kenly & Co., Chicago 44, Ill.

Power Factor. Electric Machinery Mfg. Co., East Minneapolis 13, Minn., has available a booklet called "The ABC of Power Factor."

Lathes. South Bend Lathe Works, South Bend, Ind., has published a full-color catalog describing its line of 9-in. engine and toolroom lathes.

Centrifugal Pumps. Information applicable to all makes of centrifugal pumps is presented in a new booklet of facts by The Deming Co., Salem, Ohio.

Packing. A pocket-size folder, Bulletin P-3, on Palmetto packing for all purposes, is offered by Greeme-Tweed & Co., New York 66, N. Y.

Excavating Equipment. Second of a series, a new 36-page booklet of Bucyrus-Erie Co., Milwaukee, Wis., describes the various military uses of the company's shovel equipment.

Tractors. The Caterpillar D8 tractor is thoroughly described in a new catalog issued by Caterpillar Tractor Co., Peoria, Ill.

Rotary Dryers. Louisville direct-heat rotary dryers are described in a new bulletin of General American Transport Corporation, 514-b, Graybar Bldg., New York 17, N. Y.

Hydro-electric Plants. A 24-page bulletin (B6356) on centralized control provided by modern governors for large hydro-electric units has just been released by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Deaerated Water. Cold-water deaerators to check corrosion of pipes and equipment are described in Reprint 43 of Cochrane Corporation, Philadelphia, Pa.

Concrete Mixers. The 3-bag size of concrete mixer is fully described in a new catalog just published by the Kwik-Mix Co., Port Washington, Wis.

Core Drills. A complete description of types of equipment used for earth sampling, such as core drills, and suggestions for their proper use are given in a bulletin, "Core Drills," published by Acker Drill Co., Scranton 3, Pa.

Training Engineers. A complete engineering graduate training course covering various activities is outlined in a brochure, "Where Do We Go From Here?" recently published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Centrifugal Casting. Bulletin 645 of Centrifugal Machine & Engineering Co., Kalamazoo 7, Mich., describes a machine and methods for producing centrifugal castings.

Oxygen. How oxygen is made and how it is used in industry is described in a new bulletin, No. ADG-2014, available from Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

Surplus Goods. "How to Do Business With the RFC" is the title of a booklet listing 3,000 items of surplus property, which is available at the Reconstruction Finance Corporation, Washington, D. C., or your nearest local office.

Rotameters. A new edition of the booklet, "Theory of the Rotameter," describing methods of liquid flow measurement, is now available from Fisher & Porter Co., 9145-A County Line Road, Hatboro, Pa.

Get Higher Tonnage From Tough Layouts with Walter Tractor Trucks

BIG LOADS OUT OF TIGHT SPOTS. Highly maneuverable in close spaces, Walter Tractor Trucks' 40-ton payload keeps shovels working at capacity.

TURNS ON A DIME. The short wheelbase gets away in a half turn . . . permits flexible maneuvering on sharp curves. Hydraulic steering gives fingertip control.

SPEED ON STRAIGHTAWAYS. Fully loaded to 40 tons, Walter Tractor Trucks travel 25 m.p.h. on level stretches. You get more tons per trip . . . more trips per day.

The great power and traction of Walter Tractor Trucks are "made-to-order" for the tough running conditions, curves and grades in open pit mines. Iron ore mines operating with Walter Tractor Trucks are hauling 40-ton payloads over the toughest layouts—making more trips per day—delivering greater tonnage per unit, at lower cost per ton.

Powered by a 300 h.p. motor and incorporating the great traction of the Four Point Positive Drive, Walter Tractor Trucks haul unfailingly through soft dirt, mud, slippery surfaces and up steep grades. This smooth traction, coupled with minimum unsprung weight to retard bouncing, prevents damage to road and tires. In every detail, Walter Tractor Trucks are constructed to open pit requirements. Have one of our engineers give you the facts and figures. Or write for detailed literature.

WALTER MOTOR TRUCK CO., 1001-19 Irving Ave., Ridgewood, 27, Queens, L.I., N.Y.

WALTER
TRACTOR TRUCKS

PERSONAL NEWS

F. O. Case, formerly general manager of the Basic Magnesium plant near Las Vegas, Nev., has been appointed assistant to the president of Anaconda Copper Mining Co., with headquarters at 25 Broadway, New York. He succeeds **E. O. Sowerwine**, who recently became a vice president of the company.

Philip R. Lynch, for 30 years engaged in mining work with the Phelps Dodge Corporation at Tyrone, N. M., retired on July 1 at his own request because of ill health. He has been succeeded as agent in charge of the Burro Mountain Branch of the Phelps Dodge Corporation by **E. C. Peterson**, of Douglas, Ariz.

Hans Nelson, a pioneer in the development of iron properties of the western Mesabi iron range, and long associated with New Cornelia operations at Ajo, Ariz., has retired and established his residence at Tucson, Ariz.

Harlan H. Bradt, former Duluth (Minn.) mining engineeer, has been made managing engineer for Tungsten Mining Corporation, a newly organized combination of tungsten holdings of General Electric and Haile Gold Mines Co. **Edmund Newton** has been appointed mine manager.

Howard G. Wilcox, dean of the School of Mines at the University of Alaska, was in Seward, Alaska, in August in connection with the examination of the Primrose and other properties.

William E. Wrather, director of the United States Geological Survey, and **John Reed**, acting head of the Alaska Branch, were in Fairbanks, Alaska, in August on their way to an inspection trip to the Barrow area.

H. M. White has resigned as superintendent of Champion Reef mine, in India, and has returned to England.

Howard L. Johnson, until recently safety engineer for Demerara Bauxite Co., Mackenzie, B. C., has been made assistant metallurgist of Combined Metals Reduction Co., Pioche, Nev.

Loraine M. Buhler, metallurgical engineer, has joined the staff of Carbide & Carbon Corporation, his address being 40 Woodette Place, Buffalo, N. Y.

Richard P. Darnell, of the staff of the Foreign Economic Administration, has been transferred from Rio de Janeiro to Washington, D. C. His address is 1368 Quincy St., N. W., Washington.

William S. Levenhofel, recently with the U. S. Geological Survey as a geologist, has been transferred to the Naval Research Laboratory in Washington, as a physicist.

Charles Chapman, lately with Minerals Separation North American Coporation, is now centrifugal engineer with Bird Machine Co., P. O. Box 71, Walpole, Mass.

W. J. Wilbur Harris has resigned from the staff of Colonial Mica Corporation, Custer, S. D., and has returned to the Bald Mountain Mining Co., Trojan, S. D. He may be addressed at 315 S. Main St., Lead, S. D.

Erwin C. Hoeman, formerly chemical engineer with U. S. Bureau of Mines at Rolla, Mo., and with T.V.A. at Wilson Dam, Ala., has become a research engineer at Battelle Memorial Institute, Columbus, Ohio.

Irving G. Irving has left Butte, Mont., where he was directing the operations of Quartz Hill Leasing Co., to become mining engineer for the Copper Division of WPB. He may be reached by addressing 6 Leland Court, Chevy Chase, Md.

Francis C. Lincoln has been transferred by the U. S. Bureau of Mines from Platteville, Wis., to Rapid City, S. D. He will act as examining engineer for the Black Hills region and may be reached at 613 Quincy St., Rapid City, S. D.

Charles M. Campbell has been appointed general superintendent of Siscoe Gold Mine, at Siscoe, Que.

John W. MacKenzie, assistant manager and mine manager of Bankfield Consolidated Mines, Bankfield, Ont., has been made chairman of the Western Quebec Branch of the Canadian Institute of Mining and Metallurgy.

H. A. Quinn is consulting geologist for Jawtam Key Gold Zones (Rambler), Ltd. The property is on the northeastern coast of Newfoundland.

Charles W. Davis has been made chief of the Boulder City, Colo., division of the U. S. Bureau of Mines, metallurgical branch.

R. Ian Rankin is managing the Eldorado mine at Tennant Creek, Northern Territory, Australia.

Dr. G. K. Williams, who developed and installed the continuous desilverization process for lead bullion at the works of Broken Hill Associated Smelters, Ltd., at Port Pirie, South Australia, has been appointed general superintendent of the company.

Leo J. O'Neill has been appointed assistant superintendent for Phosphate Mining Co. at Nichols, Fla.

Joseph A. Mecia, until recently chief engineer and geologist for Bradley Mining Co.'s Yellow Pine mine, has become manager of the Ima mine, at Paterson, Idaho.

Robert D. MacAfee is directing the construction of a 500-ton-a-day limestone plant for Grants Pass Lime Products at Marble Mountain, Ore.

N. W. Rice has been re-elected president and made chairman of the board of U. S. Smelting, Refining & Mining Co. **C. F. Moore**, who has retired as vice president and consulting engineer, will remain with the company in a consulting capacity.

George H. Kemmer, mining engineer and geologist and recently with the mining division of National Development Co., has gone to the Far East. He may be addressed care of A.P.O. 500, OCE, GHQ, Postmaster, San Francisco.

N. L. Smith recently left England to accept a post with the British Aluminum Co., Ltd., on the Gold Coast, Africa.

J. Murray Riddell, who has been manager of the mining division of E. J. Longyear Co., of Minneapolis, since Jan. 1, 1941, and was previously with Republic Steel Corporation and other companies in an executive position, has been appointed head of the department of mining engineering of the Michigan College of Mining and Technology at Houghton, Mich. He will assume his new post on Sept. 26.

Essington Lewis, who during the war has held the position of director general of munitions to the Commonwealth Government, has returned to his original position of chief general manager of the Broken Hill Proprietary Co., Ltd.

J. C. Jenkins, associated for more than 25 years with the Central Provinces Manganese Ore Co., Ltd., operating in India, has retired and returned to England.

Eugene C. Anderson, formerly with International Minerals & Chemical Corporation at Carlsbad, N. M., has been named director of the New Mexico Bureau of Mines and Mineral Resources. He succeeds **A. D. Hahn**, who has resigned to enter business.

Ed P. Phillips, of Richmond, Va., has terminated his service as head of the machinery division of the Office of Surplus Property, Department of Commerce, having completed a year in that capacity. He will return to the full-time direction of his own companies in Richmond, Va., Washington, D. C., and Baltimore, Md.

John H. Eggers, mining engineer and geologist, who was with the Mineral Production Security Division of

the U. S. Bureau of Mines for three years, until the division was discontinued June 30, 1945, has returned to California and will resume private consulting work. His address is 8220 S. New Hampshire Ave., Los Angeles 44, Calif.

M. W. Woolley, formerly manager of the ore-purchasing department of United States Smelting, Refining & Mining Co., is no longer connected with that company. Purchase of ore and concentrates for the company's Midvale plant will continue, as in the past, to be under the direction of **Robert Wallace,** manager of the Midvale Plant. **F. X. Meyer,** chief clerk of the ore-purchasing department, and **Blaine Watts,** ore buyer, will continue in their respective capacities under Mr. Wallace and may be reached at the company's offices in the Newhouse Building, Salt Lake City. (Mail address Box 1980, Salt Lake City 13, Utah.)

J. C. Ferguson, recently serving in the Army of Great Britain, has returned to his post with the Southern Rhodesia Geological Survey.

J. C. Roehm, a mining engineer for the Alaska Department of Mines, has spent a month in the Ketchikan district sampling and exploring mineral deposits for different owners. He says that there is a market for many non-metallic minerals found in that region, such as quartz crystals, garnets, asbestos, barite, beryl, celestite, vermiculite, and others.

James Douglas, Deputy Vice Chairman for Minerals and Metals, has resigned from the War Production Board to join the sales division of the Phelps Dodge Corporation. He will take up his new position later this year.

Geo. C. Lipsey, of the Howe Sound Exploration Co., Ltd., formerly mine superintendent at the Britannia Beach mine, has moved to Winnipeg to direct development of the company's gold property at Snow Lake, Manitoba, and bring it into production. A 2,000-ton mill is planned.

Dr. Robert Coates, with the U.S.G.S., and formerly a member of the faculty of the University of Alaska, has been spending the summer making placer gold investigations.

W. G. Clinton recently left England to resume his post as manager of Amari Mines, Ltd., in Nigeria.

Howard A. Meyerhoff, geology professor at Smith College, has been made executive secretary of the American Association of Science.

Dr. H. Foster Bain, who is on special assignment for the United States Bureau of Mines, was in Fairbanks and Nome, Alaska, in August.

N. D. Chapra, consulting mining and metallurgical engineer in New York, has returned to London.

A. C. McDonald, senior research metallurgist at the Kalgoorlie Metallurgical Laboratory, Western Austra-

Nothing to get out of order in this

BRIGGS LUBE OIL CLARIFIER

REFILL HOLDING ASSSEMBLY produces positive seal on cartridge
RELIEF VALVE maintains correct pressure
BRIGGS PATENTED CARTRIDGES remove contaminants

Briggs Fullers Earth Cartridges clean straight mineral oil 3 times—3 ways, remove visible and invisible contaminants. Briggs Discel Cartridges remove dirt from additive-type oils without affecting the action of the additive. Both are interchangeable in all Briggs Clarifiers.

DR Series Lube Oil Clarifiers are available in capacities ranging from 1GPM to 20GPM.

Dirty oil goes in—Clean oil comes out

Briggs DR Series Lube Oil Clarifiers are designed for simplicity of operation—THAT'S WHY MAINTENANCE IS SO LOW. Not one moving part to give trouble . . . Just change the refills when necessary—that's all!

A simple, effective refill sealing assembly, a permanently set relief valve and Briggs Patented Fullers Earth or Discel Cartridges do the complete job.

Whatever type of oil you use, whatever size or type internal combustion engine you operate, this SIMPLICITY will save you MORE money while maintaining your lube oil effectively.

Get the facts and literature about Briggs Oil Clarification from the Briggs distributor nearest you. Consult the "Filters" section of your classified telephone directory, or write direct to manufacturer.

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lia, has been appointed to the position of officer in charge of the newly formed research department at Broken Hill Associated Smelters, Ltd., Port Pirie, South Australia.

Leonard G. Thomas, general superintendent at Pioche, Nev., for Combined Metals Reduction Co., has been advanced to executive assistant to E. H. Snyder, president, Salt Lake City. Mr. Thomas succeeds R. L. Dean, who becomes general superintendent at Baxter Springs, Kan., for St. Louis Smelting & Refining Co. Samuel Arntz, Jr., succeeds Mr. Thomas as general superintendent and Paul Gemmill, superintendent at Pioche for Prince Cons Mines Co., joins Combined Metals as geologist in charge of mining engineering at Pioche.

T. C. Botterill, of Vancouver, B. C., has become consulting engineer to Pinebrayle Gold Mines.

L. A. Warner and **Karl Stefansson** recently joined groups of U. S. Geological Survey field men exploring the northern part of Alaska.

W. A. Brickwell has been released from the British armed forces to act as Mines Inspector in Kenyan Colony.

Ralph E. Sinke, field engineer for Panameric Mines & Resources Co., Ltd., at Vancouver, B. C., may be addressed at 3772 West 17th St., that city.

Keith Roberts has returned to Alaska to take charge of the land division of the Alaska Native Service, his address being Box 589, Juneau.

Lieut. Col. J. D. Boyd has been made director of the Mining and Metallurgical Section of the British Element of the Allied Commission for Austria.

Elwood S. Moore, since 1938 head of the department of geology at the University of Toronto, has been elected president of the Royal Society of Canada.

Robert B. Gayer has been made vice president and managing director of Cangold Mining & Exploration Co., 711 Credit Foncier Building, Vancouver, B. C.

Earl H. Miller, recently mine superintendent for Pend Orielle Mines & Metals Co., has gone to Hershey, Pa., to act as consultant manager for Annville Stone Co.

William A. Conley, who recently returned to the United States from South America, where he had been doing consulting work, may be addressed at 2204 East 7th St., Tucson, Ariz.

Howard H. Utley, of Baxter Springs, Kan., second vice-president and local manager of the St. Louis Smelting & Refining Co., has retired as head of the company's operations in the Tri-State district.

K. L. Cochran, geologist for the Baroid Sales Division of the National Lead Co., has been transferred by the company from its barite operation

near Magnet Cove, Ark., to Los Angeles, where the company's main office is located.

W. F. Netzeband, of Joplin, mining engineer for the American Zinc, Lead & Smelting Co., has returned from New Mexico, where he spent several months doing geological work for his company in the Silver City mining district.

Herbert Hoover recently spent several days at Pioche, Nev., inspecting lead-zinc mines and 800-ton selective-flotation mill of the Combined Metals Reduction Co., as guest of E. H. Snyder, president. He was accompanied by his sons, Herbert, Jr., and Alan, by Edgar Rickard, and by his secretary, Miss Bernice Miller.

Charles A. Banks, president of Placer Development, Ltd., has returned to Canada after five years in London, as representative of the Canadian Department of Munitions and Supply.

Dr. Warren J. Mead, of the Massachusetts Institute of Technology, who has been on leave of absence to serve as director of Reynolds Research at Glen Cove, Long Island, during the war period, has resumed fulltime duties as head of the department of geology at M.I.T. He will continue to act as research consultant for the Reynolds Metals Co.

J. W. Still has been appointed mine superintendent of Miami Copper Co. **B. R. Coil** has been named general superintendent of Miami Copper Co. and Castle Dome Copper Co., operating in the Globe-Miami region of Arizona.

George R. Fisher, who is superintendent of Zinc Corporation, Ltd., at Broken Hill, N.S.W., Australia, has been visiting mining districts in the United States and Canada. He arrived in Ishpeming, Mich., on Aug. 16 and was traveling to Flin Flon, Manitoba, via Duluth, Hibbing, Minn., on the Mesabi Range, and Winnipeg. He expected to get back to Toronto by the latter part of August.

Orr Woodburn, former director of Globe-Miami (Arizona) first-aid rescue station, will assume charge of a similar station in Chile for Braden Copper Co.

Victor K. Taipale recently resigned as chief engineer for Charleson Iron Mining Co. on the Mesabi Range and has gone to Akron, Ohio, to join the Industrial Products Division of B. F. Goodrich, rubber and synthetic products.

Kenneth Brown, formerly associated with Stone & Webster Engineering Co., of Boston, Mass., has accepted an executive engineering post with Magnet Cove Barium Corporation, of Malvern, Ark.

Booker H. Bucker, Jr., formerly research engineer in the Joplin plant of the Eagle-Picher Lead Co., who has been employed in the same capacity for the last two years at the company's Hillsboro zinc oxide plant, has been transferred back to the research laboratory of the local plant. He formerly was employed as an engineer with the St. Louis Smelting & Refining Co. prior to accepting a position with the Eagle-Picher company.

R. S. Weaver has resigned his position as mine superintendent with the U. S. Gypsum Co., at Gypsum, Ohio, to join the staff of United Clay Mines Corporation, of Trenton, N. J., as chief engineer.

Charles C. Starr has been engaged as chief consulting engineer and geologist by Santiago Mines, Ltd. **Thomas H. Buckham**, formerly with Silbak Premier Mines, Ltd., has also joined Santiago and has been placed in charge of the reconditioning of the Bosun mine, in the Slocan district of British Columbia.

William H. Hax, Butte, Mont, has been elected a director and appointed vice president and managing director of Surf Inlet Consolidated Gold Mines, Ltd.

S. B. Wright, formerly vice president of Deloro Smelting & Refining Co., Ltd., has retired and is now living in Vancouver.

Capt. Norman E. McConnell has been elected a director of Privateer Mine, Ltd.

William J. Cuming, metallurgist of Commonwealth Fertilisers & Chemicals, Ltd., Melbourne, Australia, is in British Columbia in the course of an inspection tour of chemical plants in Canada and the United States.

A. L. Blomfield has been appointed president of Lake Shore Mines, Ltd., Kirkland Lake, Ont., succeeding Al Wende, who remains with the company as a member of the board. **John Adamson** has been made superintendent of company operations.

Dr. Joseph T. Mandy, resident engineer at Vancouver for the B. C. Department of Mines, is making a survey of a little-known area in the Naas River valley, Portland Canal mining division.

Gordon Brown is in charge of Pioneer's development work at the Proserpine gold property.

H. C. Wilmot, consulting engineer of San Francisco and former manager of the Lorne mine (now Bralorne), is making examination of mineral deposits in Yukon.

OBITUARIES

Frank Benane, pioneer in many Nevada mining districts and active in Alaska around the turn of the century, died on July 10 at the home of relatives in Martinez, Calif. He and his brother Edward had much to do with the early development of such Nevada camps as Jarbidge, Gold Circle, and Mountain City.

Burrell R. Hatcher, 60, prominent mining man, died in Tucson, Ariz., on July 26. Mr. Hatcher was born in Prescott on June 13, 1885, and was a graduate mining engineer of the University of Arizona. He was associated with the American Mining & Smelting Co., having served 21 years with that company until his retirement a few years ago.

Max Krom, a mining engineer with Balatoc Mining Co., in the Philippines, when the war started, and who was with the U. S. Engineers on Corregidor when captured by the Japanese, is reported to have lost his life on a Japanese prison ship that was sunk on Oct. 24, 1944. Mr. Krom was the son of Mr. and Mrs. Archie Krom, his father being president and western manager for West Coast Machinery Co., Seattle, Wash.

Walter E. Segsworth, a pioneer in the development of Cobalt mining district, in northern Ontario, consulting mining engineer and president of Montana Porcupine Mines, died at Toronto on July 20 last. He was 65 years old.

W. G. Hanson, a former Iron River (Mich.) mining executive for Verona Mining Co., died recently at Iron River at the age of 68.

Prof. Herbert William Gartrell, professor of mining and metallurgy at the University of Adelaide, who has held a prominent position in Australian metallurgical development, died on June 8, at the age of 62 years.

H. W. Parrish, 60, mining operator, died in Nogales, Ariz., on July 27.

John P. Smith, 55, Arizona mining man, died in Phoenix on July 12.

James B. Rolle, long time mining man of Morenci, Ariz., died in that city recently.

Col. O. B. Perry, 69, well-known consulting mining engineer and, dredge operator, and commander of the 27th Engineers in the first World War, died in San Francisco, Calif., on July 24 of shock and asphyxiation suffered while trying to extinguish a fire which destroyed his cottage in the Family Club Farm, near Woodside, Calif.

Frank Oates, former chief geologist, Department of Lands and Mines, Tanganyika Territory, British East Africa, died in England on June 10 last at the age of 48. He was an alumnus of the Royal School of Mines, served in the first World War in the Grenadier Guards, and was wounded on the Somme in 1916.

Arthur Shonbeck and **John Baton**, two outstanding Alaskan pioneers and mining men, were killed in an automobile accident at Gaines Creek in the Ophir district, Alaska, on June 20.

Justus R. O'Brien, vice president of the Ingersoll-Rand Co., of New York, died on Aug. 9 in New York. He was 55.

REGIONAL NEWS

UTAH

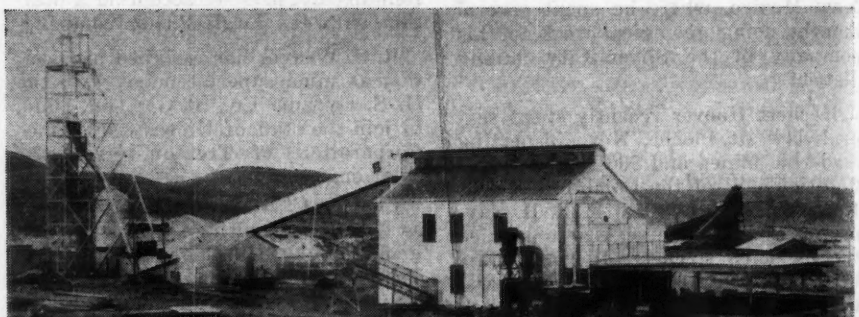
Utah Copper appeals tax case—Barber Asphalt Co. to expand gilsonite plant

★An appeal to the U. S. Supreme Court is planned by Utah Copper Co. from a decision July 23 by the Tenth Circuit Court of Appeals, Denver, to the effect that federal courts were without jurisdiction to order refund of taxes paid to the state of Utah on metal premiums. C. C. Parsons, company attorney, said the Supreme Court will be asked to issue a writ of certiorari ruling that federal courts have jurisdiction in the matter. The Circuit Court reversed a decision by the Federal District Court, Salt Lake City, restoring taxes paid under protest on metal premiums by Utah Copper Co., unit of Kennecott Copper Corporation, and Silver King Coalition Mines Co. The majority opinion, written by Walter A. Huxman, held that the State of Utah had not permitted litigants to use federal courts, but the reversal acknowledged that Utah had waived its immunity from suit in the State courts. Judge O. L. Phillips dissented. Six other Utah mining companies have filed suit in State courts for recovery of taxes paid on federal metal premiums. Decisions on these cases are still pending.

★Negotiations are in progress between Utah Copper Co. and CIO and AFL unions regarding payment for travel time of 1,700 workers in open-pit mining operations of the company at Bingham. The WLB ruled July 25 that workers were entitled to travel time going on and off duty on the big 800-acre operation. The board at that time directed the company and unions to negotiate the amount or method of determining the travel time involved.

★Silver King Coalition Mines Co. for the quarter ended June 30 made a net profit of $6,395.04 after all taxes and depreciation, but before depletion, equal to ½c per share on 1,220,467 shares of $5 par value common stock outstanding. Net profit for the year ended June 30, 1945, was $31,245.73, or 2.6c per outstanding share.

★One hundred English-speaking negroes from Barbados Islands arrived at Garfield July 25 to ease the labor shortage at the American Smelting & Refining Co. plant there, William J. O'Connor, general manager, reported. The men, recruited at Miami, Fla., where they were doing farm work, are under contract to remain on the job at the smelter at least 90 days. They are housed in trailer units and are paid a basic wage of about $7 per day, including overtime.



No. 2 BONANZA SHAFT AND WASHING PLANT of the Barber Asphalt Co.'s property at Bonanza, Utah, where gilsonite is prepared for shipment. New use of the product in foundry cores stimulated production to 4,000 tons of pulverized gilsonite per month.

★The Kalunite, Inc., plant at Salt Lake City, processing alunite and clays into alumina, will continue in operation at least 90 days from Aug. 1, S. L. Burris, manager, was notified by DPC and RFC. The decision was made following announcement July 27 in Washington, D. C., that DPC had reached the conclusion there was no object in continuing operation of the plant. The Kalunite plant, revamped by Olin Industries, has operated at lower than intended capacity, but has shipped appreciable quantities of alumina for refining to metallic aluminum.

★The Barber Asphalt Co.'s gilsonite operation at Bonanza, Uintah County, where a $1,500,000 improvement and modernization program has been completed in the past year and a half, is slated for further expansion, according to an announcement by C. Sewell Thomas, Denver, consulting engineer for the company. A $30,000 Raymond mill pulverizing plant is being installed to meet a new demand for gilsonite. Gilsonite dust collected in the washing plant, at first considered virtually a waste product, found a ready market for use in foundry cores, so the mill is being installed to produce some 4,000 tons of pulverized gilsonite per month. The $1,500,000 program included construction of a model town for workers, a highly mechanized mining and processing operation, bringing water more than 4 miles and provision of a modern system with a 250,000-gal. reservoir, and a diesel power plant which furnishes current for mine and plant operations, town lighting, and pumps serving the water system. The town has a two-room schoolhouse, club house, and other community buildings.

★The Globe and Yankee mines, in American Fork Canyon, have shipped about 1,000 tons of ore since 1941 and 1942 respectively, Rich Whitmore, president of Howell Mining Co., Salt Lake City, reports. During 1943, Howell officers financed operations, and in 1944 ore shipments defrayed all production and development costs save $116. An assessment of 1c per share, delinquent Aug. 11, was levied to reimburse officers for advances made and part payment for 93 percent ownership in the Yankee mine.

★American Smelting & Refining Co. mining department has relinquished its lease on the Boston Consolidated mine of Utah Copper Co., in the Highland Boy district of Bingham, D. D. Moffet, president and general manager, Utah Copper Co., reported Aug. 8. Clean-up operations on the lease will continue for the remainder of August, or possibly longer. A shaft was sunk, and beginning late in 1943, American Smelting became a regular shipper from Boston Con. Shipments during the life of the lease were predominantly low-grade gold-silver-copper sulphide ore having excellent fluxing qualities.

NEVADA

Mt. Hope zinc-cadmium property in production—Eureka corporation resumes sinking at Fad shaft

★Eureka Corporation, Ltd., wholly-owned subsidiary of Ventures, Ltd., of Toronto, is completing installations at its four-compartment Fad shaft on

the leased Ruby Hill property of the Richmond-Eureka Mining Co., two miles west of Eureka, with the purpose of sinking to the 2,500-ft. point, where the presence of large bodies of lead-zinc-silver-gold ore was revealed by diamond drilling. The shaft had been sunk 600 ft. when the power plant was burned late last year, and new equipment includes a complete diesel plant, an electric hoist, a new headframe, shops, mine buildings, and camp facilities with water and sewer connections. A contract to complete the shaft and certain projected laterals has been awarded the E. J. Longyear Co., which conducted the first deep drilling. George W. Mitchell is Western manager for Ventures, Ltd., and William Sharp is directing engineer at the Eureka project. Staff members include M. P. Hight, superintendent; Stanley A. Feitler, mine engineer, with Vernon Manz and Harry Eather, foremen.

★Recent shipment of a carload of high-grade gold ore from the Blossom mine, at Searchlight, Clark County, in the southern end of the State, marked the resumption of gold-mining activity in that historic and once-productive district. The ore was trucked to Boulder City for rail shipment to a Utah smelter. Homer B. Mills and associates are working the mine, and other interests are reported preparing to reopen the old Quartette, Duplex, and other early producers.

★Callahan Zinc-Lead Co. is reported operating at capacity its 250-ton selective-flotation mill completed lately by the Western-Knapp Engineering Co. at the Mount Hope zinc-cadmium mine, 32 miles north of Eureka. Separation of lead was reported satisfactory. The two forms of concentrate, zinc-cadmium and lead-silver, are trucked some 80 miles north to Palisade for rail shipment to smelters. Karl K. Hood, of Eureka, is in charge.

★Nearly all lessees have been enabled to resume work in the Mizpah mine of the Tonopah Mining Co. of Nevada. Surface buildings at the main 1,500-ft. Mizpah shaft were burned early in June. Horace A. Johnson, manager, reported a damaged compressor had been repaired, as had the machine shop, and miners now reach their lease workings through the Silver Top shaft.

★A tunnel is being driven under contract for the U. S. Bureau of Mines on the Blue Metal corundum mine, in Lyon County, owned by District Judge Clark J. Guild, of Carson City; James S. Adams, and Alex Castaings, of Yerington. E. O. Binyon, project engineer for the bureau, is in charge. Ore minerals are corundum and andalusite.

★New Verde Mining Co., Newmont subsidiary, has provided a larger engine for the drill with which several holes were sunk 400 to 500 ft. a short distance north of Goldfield before cold weather halted work in December. At that time a drill bit was lost in a 400-ft. hole and work is now directed to the recovery of this bit, with plans for drilling several more holes. One is said to have passed through a 60-ft. width of quartz.

★Production of antimony ore has been resumed in the Big Creek district, southern Lander County, by Tony Romano, of Austin, who has milled some of his product locally and reports a substantial volume of stibnite available in the formerly productive claims.

★Gold property in Meadow Canyon near Belmont, Nye County, has been acquired by Carlson & Sandburg, California gold dredge operators, from W. H. Flowers, who has made some production in late years. A 320-ft. tunnel has been retimbered and provided with track, and a compressor has been delivered.

★Shipment of copper and copper-gold ore has been resumed in the Contact district, northern Elko County, where production was of considerable volume last year. The Marshall Mining Co. was shipping four carloads weekly until deep snow interfered, and is preparing to increase its output. Ore of shipping grade is reported available in that company's Bonanza mine as well as in the Queen of the Hills and Copper Button mines.

★A 30-ton furnace plant at the Red Bird cinnabar mine, in the Relief district, Pershing County, will be operated again upon completion of a raise in the mine, driven for ventilation and to provide a chute for an ore outlet to the lower tunnel. Visiting engineers describe the orebody as extraordinary, with a 20-ft. width of high furnace-grade ore, some sampling 90 lb. per ton. Owned and worked formerly by the Harolds Club Mining Co., the mine is held under option by Ervin J. Young, mining engineer, and a partner.

★Development work has been resumed by contract on gold-silver property of the Charleston Hill National Mines, Inc., a former producer of some note, 30 miles north of Winnemucca, in Humboldt County. Mrs. Mary Clough, president, has announced plans to deepen the main shaft and reopen a 1,200-ft. tunnel. Equipment includes power plant and 30-ton concentrating mill.

★A bulletin prepared for the U. S. Bureau of Mines by Glenn L. Allen, district engineer for the Bureau in Nevada, with assistance of engineers of the Boulder City office, stresses the prospect that the 1,000-ton manganese nodulizing plant at the Three Kids mine, in Clark County, may be an economic success if converted to employ the electrolytic process perfected at the Bureau's Boulder City experiment station, with production cost of 7.5c per pound, based on output of 40 tons of metal per day. The Three Kids mine is known to contain more than 3,000,000 tons of usable manganese ore, in addition to 320,000

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Nevada (*continued*)

tons stockpiled. The plant, operated by the Manganese Ore Co., M. A. Hanna Co. subsidiary, for the Defense Plant Corporation, has been declared surplus property and will be offered for sale or lease.

★Consolidated Coppermines Corporation has reported for the first quarter of 1945 net income of $287,399 before charges, comparing with $199,724 for the first 1944 quarter. After all charges except depletion, net income for the period was $128,676, against $17,689 in the same quarter last year. John A. Payne, of New York, is president of the company, which operates at Kimberly.

★Gold property formerly known as the Homestake mine, located in the 60s, productive and supplying a small mill in the 90s, situated in the old Antelope district some 30 miles north of Reno on the California line, is to be reopened by the newly organized Mexivada Mines Corporation, headed by Frank E. Horton, Jr., and William Van Der Heggen, with office in Reno. Development, still largely accessible, includes a 700-ft. tunnel, a 200-ft. shaft, and an 80-ft. winze below the shaft bottom. Records indicate production of high-grade gold and gold-copper ore for shipment and for a small amalgamating mill, tailing from which is said to have yielded over an ounce gold per ton in later treatment. A late geophysical survey in the U. S. Bureau of Mines is said to have indicated several orebodies along the strike of the parallel Homestake and Mars veins. A Boston company sank the shaft and built the mill in the mid-90s.

MONTANA

U.S.B.M. to explore Buckeye and Minah mines—Drumlummon mine reopened

★Metals Reserve Co. recently shipped one carload of corundum ore from the Fuller corundum mine, near Gallatin Gateway, to Rolla, Mo., for testing by the U. S. Bureau of Mines. Results at the pilot plant demonstrated that a high-grade concentrate can be produced by the sink-float process. Owen Perry, of Helena, acting as consultant for MRC, conducted a thorough re-examination of the property and observed the laboratory work. W. A. Calhoun, U. S. Bureau of Mines metallurgist, supervised the beneficiation tests.

★Dredging operations are getting underway slowly in Montana because of scarcity of labor and supplies. Porter Bros.' dredge started operation immediately north of Helena shortly after July 1. Winston's dredge at Jefferson City and the Emmigrant Gulch dredge plan to resume operation this fall. The Perry-Schroeder dredge at

Hauser Lake operated during the war to produce strategic commercial sapphires, and is now unable to resume production until a program of exploration has developed new reserves.

★The State Bureau of Mines has been carrying out an intensified program of aid to prospectors and small operators during the summer months. The Bureau is headed by Dr. F. A. Thomson, director. J. M. Conrow and L. L. Slose are full-time members of the staff. E. S. Perry, S. R. B. Cooke, and O. A. Dingman are carrying on Bureau work in conjunction with their teaching duties at the Montana School of Mines. Thomas Karlstrom and Charles Higgans have been employed for the summer months.

★Montanans, Inc., recently established an Industrial Development Division for the purpose of stimulating industrial growth of the State. A. T. Peterson is director, and T. W. Oster, formerly with the U. S. Bureau of Mines, is engineer consultant. The new division plans to stress the production and fabrication of mineral resources, especially in the non-metallic field.

★Two new projects in Montana were recently approved by the U. S. Bureau of Mines, and field work will get under way immediately. The Bureau plans to diamond-drill the Buckeye mine, a zinc-lead property in Madison County, which is operated by Victoria Mines, Inc. The Minah mine, in Jefferson County, will also be explored. This property has a production record of $2,000,000 in silver and lead, but has not produced since shortly after the turn of the century.

★Senator Wheeler recently asked for a complete re-examination of the Montana chrome project in Stillwater County. This property, which includes two large concentrating plants and large developed mines, has been on a standby basis since June 1943.

★The Drumlummon mine, in the Marysville district, is being reopened by Y. P. Wade and R. H. Rheem, who plan early production. A modern 150-ton amalgamation-flotation mill has been erected and a diesel locomotive is to be installed to facilitate underground transportation. The Drumlummon was discovered in 1876 by the late Col. Thomas Cruse, who first came to Montana in 1866 to work in the rich Alder Gulch placers. Colonel Cruse operated the mine until 1882, when he sold it to the Montana Company, Ltd., of London. During the next few years the property produced more than $30,000,000 in gold. The present operating company is called the Montana Rainbow Mining Co.

★The Choteau iron deposit situated a few miles from Choteau, in Teton County, is being explored by the U. S. Bureau of Mines. Don Hoieckvam is supervising the diamond drilling done under contract by Gust Carlson, of Helena. The deposit was originally estimated to contain more than 30,000,000 tons of ore assaying about 27

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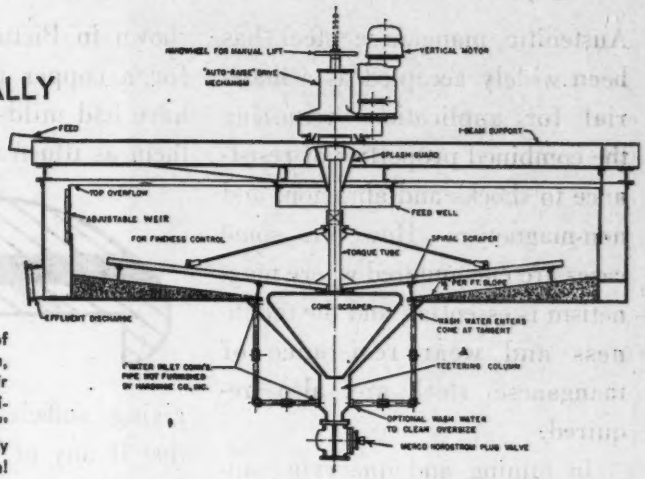

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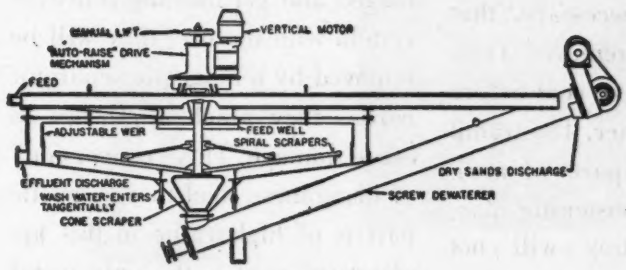

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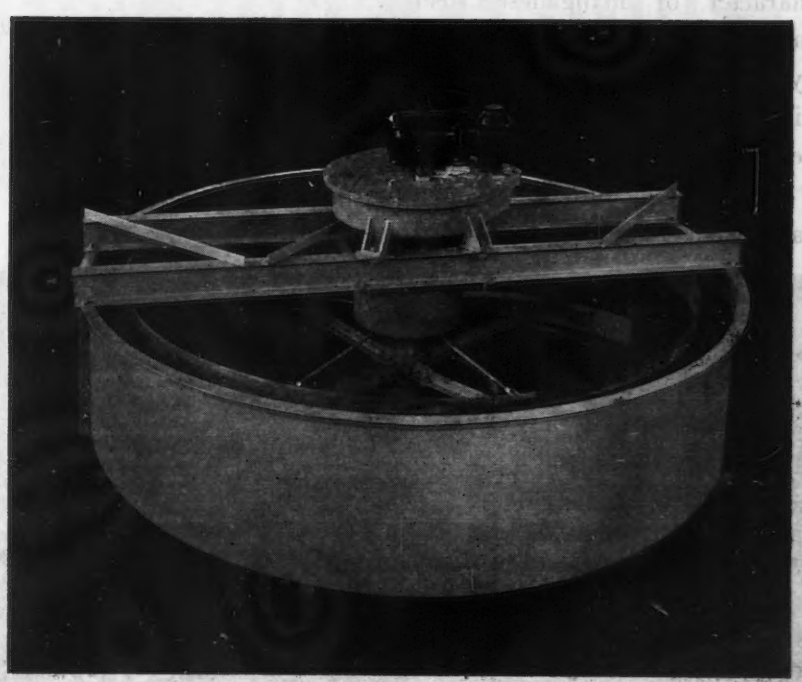

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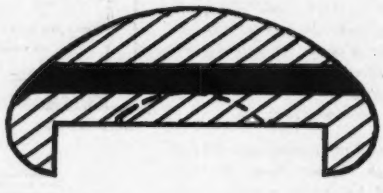
How Manganese Steel Castings Can Be Made Magnetic *When Conditions Require It* . . . . . .

Austenitic manganese steel has been widely accepted as a material for applications requiring the combined properties of resistance to shocks and abrasion, and non-magnetism. However, some cases are encountered where magnetism is essential, and the toughness and wear resistance of manganese steel are also required.

In mining and quarrying operations, it is necessary that "tramp iron" be removed from the ore, stone, clay or coal before it reaches the crusher. The tramp iron may include parts of manganese steel. An austenitic manganese steel casting will not respond to the magnetic separator. However, the non-magnetic character of manganese steel castings can be, in effect, offset by "casting in" pieces of an ordinary steel that responds to magnetism.

The 24 tons of Amsco manganese steel grizzly bar caps shown in Picture C-8767, made for a copper mining operation, have had mild steel rods cast in them as illustrated in the sketch,



giving sufficient magnetism so that if any of them become dislodged and get into the conveyor system with the ore, they will be removed by a magnetic separator before they reach a crusher to cause damage. This "conversion" of manganese steel to a magnetic part is of high value in this application, as it is the only metal which will stand up for appreciable periods in the abusive service to which grizzly bar caps are continuously subjected.

Send for Bulletin 1144-NM, "Non-Magnetic Applications of Amsco Manganese Steel."

Important part played by Amsco Power Shovel Dippers in Mining Told in Bulletin 641-D.

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OFFICES IN PRINCIPAL CITIES

Montana *(continued)*

percent iron; 0.002 percent sulphur; 0.07 percent phosporous; 0.17 percent vanadium; and 7 percent titanium oxide. The ore is essentially magnetite and ilmenite contained in a flat-lying sandstone. A total of 74 short, vertical holes are proposed, about 45 of which have been completed.

★On July 26 Carl J. Trauerman, president of Ruby Gulch Mining Co. and manager of the Mining Association of Montana, addressed the Butte Rotary Club on gold mining. Voicing his faith in the future of gold despite the views of certain British and American officials, Trauerman described some of the difficulties the gold miner presently faces. He dwelt particularly on the long fight to prevent the SEC from strangling the financing of new mines, pointing out some progress in achieving mutual understanding.

WASHINGTON

Senate investigates aluminum and magnesium plant disposal—Sodium production started at Mead

★Electro-Metallurgical Co., subsidiary of Union Carbide Co., started production of sodium metal in Spokane on Aug. 1. It is using for this purpose the government's magnesium plant at Mead, just north of the city, which was built at an estimated cost of $20,000,000. The material used in the production is common salt from California. The Mead output will be used in the production of tetraethyl lead gasoline. A ferrosilicon process is used for the reduction of the salt solution. Additional silica can be obtained at Denison, north of the Mead plant. The enterprise started with a working force of 140 men, which will be increased to more than 300 men. G. H. Griffin is superintendent.

★A senatorial committee scheduled to arrive in Spokane Aug. 20 will investigate all details by which private interests will acquire the government-owned aluminum and magnesium plants in the Northwest. Senators Hugh B. Mitchell, of Washington; Harley Kilgore, of West Virginia, and Homer Ferguson, of Michigan are on the committee, of which President Truman was a member. Reynolds Metals Co., Aluminum Company of America, and Columbia Metals Co. have indicated a wish to acquire some of the Government's light metals plants at Spokane.

★The Non-Ferrous Commission of NLB reports that it will conduct further hearings of the demand by the International Union of Mine, Mill & Smelter Workers for the elimination of differences paid men and women by the Electro-Metallurgical Co. at Spokane. The company contends pro-

Washington (*Continued*)

duction by women is usually 10 percent less than that of men, and that the state laws compel rest periods for women after two hours of work.

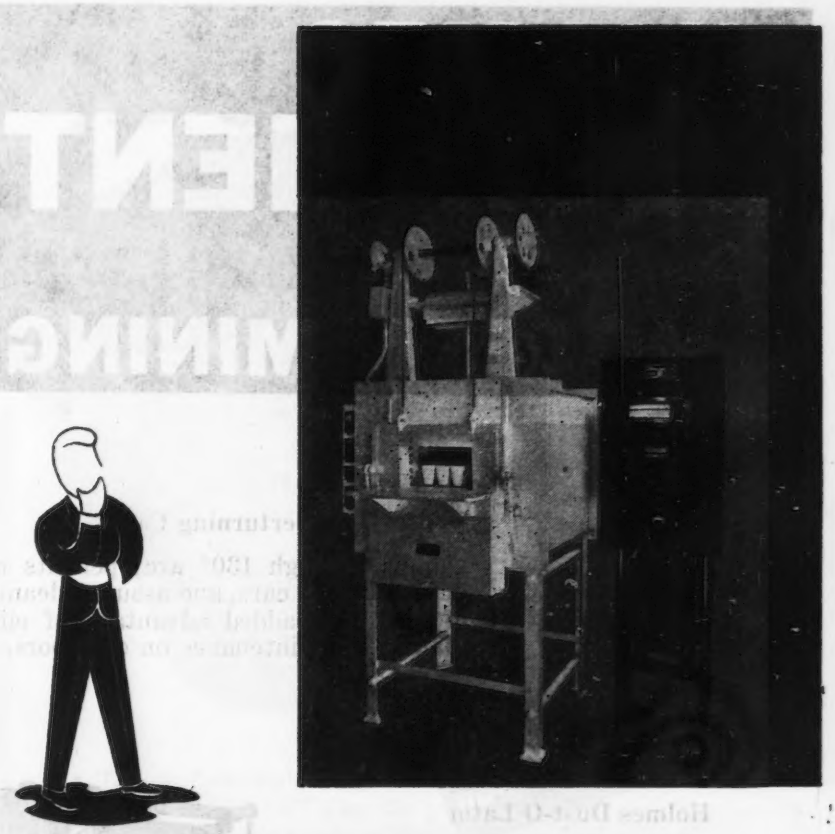
★A half ton of lead and zinc concentrates from the Young America mine, near Bossburg, Stevens County, was produced at the Victory Metals mill at Palmer Siding, four miles west of Colville. The mine is under lease to Perry Leighton and associates of Colville. The shipment contained 10,970 lb. of ore. Lead concentrates showed 69.4 percent lead, 8.3 percent zinc, and 156.5 oz. silver. Zinc concentrates showed 16.8 percent lead, 44.3 percent zinc, and 44.7 oz. silver. Plant feed assayed 7.92 percent lead, 10.5 percent zinc, and 16.7 oz. silver, and tailings 5.16 percent lead, 6.8 percent zinc, and 8.4 oz. silver. The Victory Metals mill was recently completed and is handling custom ore. E. B. Gibbs is manager of the operations and R. S. Handy is metallurgist.

★R. S. Reynolds, president, Reynolds Metals Co., informed Mayor Otto A. Dirkes of Spokane that his company hopes to put an aluminum plant in at Spokane, and that the company has asked for a one-mill power rate if the company locates at Spokane. The Mayor, addressing the Northwest Mining Association, predicted that the sale of the Washington Water Power Co. to the P.U.D. will be announced before the end of the year. "We then have to face the question of whether we prefer to operate our own facilities or be dependent on some public utility district operated from a distant point," the Mayor said.

★A mineral survey of the Grant and Okanogan counties has been ordered by the State Department of Conservation and Development, Art Garton has announced. Neal Kearney, a Seattle engineer, has been employed to assist in the work.

★L. H. Hart, chief engineer of the U. S. Smelting Refining and Mining Co., Salt Lake City, has been in Spokane and in northern Stevens and Pend Oreille counties again investigating the work which is being done by the U. S. Bureau of Mines to develop zinc orebodies. Anaconda Copper Mining Co. also is keeping in close touch with the work in these counties.

★Though the U. S. Bureau of Mines has given no information to indicate its accomplishments in exploring for zinc deposits in the Metaline district, Army engineers have been diamond drilling on both sides of the Pend Oreille River below Metaline Falls. It is understood this work is to locate a suitable site for a dam to be constructed as a postwar project. The drilling has been done by contract by the McClintock Diamond Drilling Co. of Spokane, and by Lynch Brothers of Seattle.



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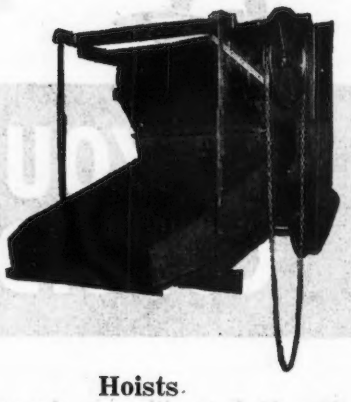

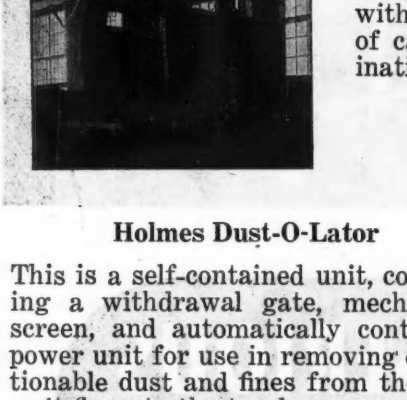

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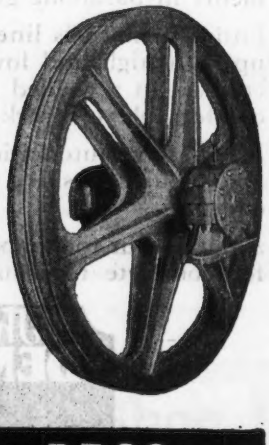

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DANVILLE, ILLINOIS

IDAHO

Bunker Hill discovers new orebody—Sunshine reports on second-quarter operations

★Bunker Hill & Sullivan Mining & Concentrating Co., at Kellogg, reports the discovery of a new body of lead carbonate ore on the 1,000-ft. level, or about 1,000 ft. deep from the surface. Assays over a width of 4 to 5 ft. indicate 15 to 20 percent lead with small silver values. Though this vein may have been cut somewhere in the upper workings of the mine, says J. B. Haffner, general manager, it has never been prospected below the Kellogg tunnel level. Bunker Hll has recently expended more than $800,000 in new hoisting equipment preparatory to sinking to a depth of 4,000-ft. below the Kellogg tunnel level, which would give it the distinction of being the deepest mine in the Coeur d'Alene district, at 1,600 ft. below sea level, 600 ft. deeper than the present deepest level in the Sunshine mine.

★Sunshine Mining Co.'s preliminary report for the second quarter of 1945 shows estimated net mine earnings of $319,711.37, according to Ross D. Leisk, general manager, though the mine is operating considerably below capacity production owing to manpower shortage. Fewer than 100 men are employed. The crew under normal conditions would number more than 1,000 men. The company's tax bill for the current year totals $163,-694.07, segregated into $6,671.72 for state excise tax, $18,117.96 for state income tax, and $138,904.39 for federal income tax.

Sunshine has developed several new sources of high-grade silver-lead and silver-copper ores during the past two years, one of which is the Chester-Silver Syndicate vein. Though none of the new ore bodies are in Sunshine ground, they are all available only from Sunshine deep workings. The company owns one-half interest in the net profits of all of them with the exception of a small section of the Chester vein, 400 ft. in length, from which the net profits are divided three ways, and 16 percent of the net profits from the Yankee Girl vein, which Sunshine has agreed to pay to the Metropolitan Mining Co. All new orebodies occur in ground adjacent to Sunshine, and are owned by the Polaris, Silver Syndicate, Silver Dollar, Sunshine Consolidated, and Metropolitan mining companies. All are being developed and operated by Sunshine Mining. The Chester-Silver Syndcate oreshoot has been developed for a distance of 1,000 ft. in length and 1,200 ft. in vertical depth and from 2,500 to the 3,700-ft. level, and for a stoping width of from 4 to 20 ft. "This orebody," says manager Leisk, "may reasonably be expected to

extend below the 3,700." In his 1945 annual report, Leisk stated that "the average grade of all ore produced from Chester vein and Silver Syndicate fault zone in 1944 was 6.3 percent lead and 44.6 oz. of silver per ton. About 36 percent of the tonnage mined came from development work."

★The Spokane-Idaho Mining Co., operating the old Constitution mine, on Pine Creek, is making changes in its milling machinery to improve zinc recovery. New equipment includes a No. 18 Sub-A Special Supercharger with a capacity of 150 tons per 24 hr.

★The Hope Silver-Lead Mines Co., at Clark's Fork, has recently acquired the adjoining property, and is employing a diamond drill to prospect the ground. The property is equipped with a modern milling plant, and is producing steadily from the Hope vein.

★Sunset Minerals, Inc., operating the Liberal King mine, on Pine Creek, has taken a lease and option to purchase on a group of claims adjoining the Liberal King. The lease calls for a 10 percent royalty payment on ore production, and involves the Dreyfus, Shetland, and Berthie patented mining claims. The purchase price is given as for $19,375, extending over a period of three years. The company has recently constructed a 100-ton mill at the Liberal King.

★Development of a group of patented mining claims on Adams Creek near Weiser has been started by the Iron Mountain Mining Co., of which C. L. Randal, of Weiser, is president, and Frank Mortimer, also of Weiser, mine superintendent.

★Richness of the Chester oreshoot in the silver belt west of Wallace is attested by the annual report of the Silver Dollar Mining Co. The company owns a one-third interest in the net profits of ore production from 400 ft., east and west measurement on the vein and unlimited vertical measurement, out of a total of 6,200 ft. owned by other companies. Silver Dollar's one-third share of profits from this small territory has been sufficient during the past two years to pay the company's shareholders a $40,000 return on assessments formerly levied and to provide additional funds for new development work in other parts of the company's mineral holdings. The earned profits accruing to Silver Dollar for the year 1944 from this source totaled $242,370.57. Ore produced from this small block of ground, known as the Rotbart area, according to E. G. Gnaedinger, engineer and mine manager for the company, totaled 16,600 tons for 1944, and most of it came from new development work with a short crew of miners. The tonnage averaged a mill feed of 2.65 lead and 61 oz. silver per ton, having a combined value of $43.30 per ton. Total amount of metals produced was about 1,011,000 oz. silver, 894,000 lb. lead, and 231,000 lb. copper. Gnaedinger estimates the ore reserves

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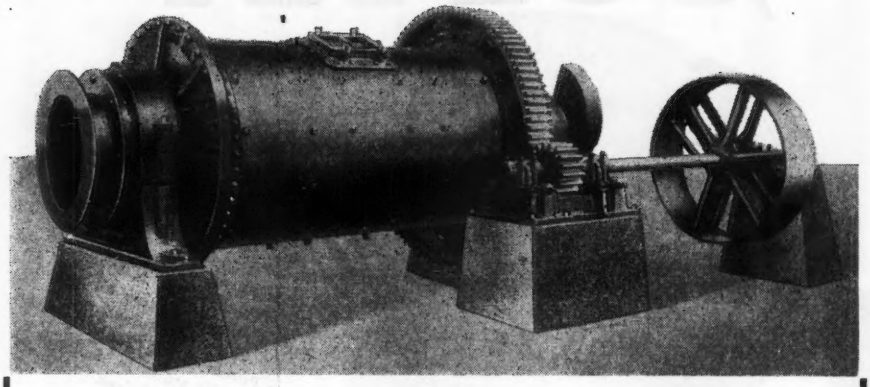

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Idaho *(continued)*

blocked out in the area to be 158,280 tons.

★The Silver Dollar Co. has a shaft development of its own on the Chester vein about 2,500 ft. east of the area currently in production. The development program now under way involves sinking the shaft from the 1,800 to the 2,700 level of the Sunshine development. Silver Dollar has a limited shoot of ore in its own workings from which the company produced several hundred thousand dollars, but the vein was badly broken up on the 1,800 level and proved non-commercial.

★V. C. Lasswell and L. M. Pastorius, who have been operating the Anchor mine, at Central City, Colo., have taken an option on a group of mining claims owned by the Copper Camp Mining Co., in Valley County, a copper-gold prospect that has been idle for several years.

★The U. S. Bureau of Mines credits Bunker Hill and Helca mining companies with having increased zinc production in Idaho 546 tons, or 8 percent, for May 1945 because of increased output from the Bunker Hill slag-treatment plant and the tailings plant operated by Hecla at Osborn. The Bureau credits Western zinc mining with a total production of 130,176 tons of zinc since the first of the year to June 1, or 49 percent of the nation's zinc output. Out of the May production of 25,987 tons, Idaho is credited with 7,354 tons.

★The Coeur d'Alene Mines Co. is engaged in sinking its main shaft from the 2,200 to the 2,600 level in an effort to reach a hoped-for enriched zone of two separate mineral veins. One of these veins has been highly productive down to the 1,800 level, below which point the silver values in the ore decreased until the orebody proved unprofitable on the 2,000 and 2,200 levels. The company then started prospecting a small vein near the shaft on the 2,200 level. This vein developed from a few inches up to five feet wide for a distance of 500 ft. and showed erratic bunches of high-grade ore in a siderite vein filling. The vein will again be prospected from the 2,400 level, but the company's original will not be reopened until the shaft work reaches the 2,600 level, for the reason that it requires 1,000 ft. or more of crosscut to reach it. The company has a modern 600-ton flotation mill, and has paid $550,057 in dividends to its stockholders.

★Laurence Dennett has been appointed superintendent of the Mackay Exploration Co. copper mining operations at the White Knob copper mine, at Mackay. The company is operating an RFC-financed milling plant. Former production has been shipments of crude ore, and this has largely been by leasers in the recent history of the porperty. Present operations is the first attempt to concen-

trate lower-grade ores, of which the mine is reported to have ample tonnage proved by development work and diamond drilling. Shipments are made to Salt Lake smelters.

★Sidney Mining Co. is named defendant in a suit brought in the District Court in Wallace by Mr. and Mrs. Vernon T. Stivers, of Boise, who seek to recover 1,800 shares of Sidney mining stock alleged to have been sold by the company for non-payment of an assessment of 1c a share levied in July 1942. The plaintiffs claim they were not notified of the assessment, and in lieu of the 1,800 shares ask damages of $4,086. Sidney stock has advanced in the past year from a few cents to around $2 a share.

★W. J. Logus & Co., of Seattle, have purchased the Vindicator group of mining claims in the new silver belt east of and adjoining the rich Lucky Friday mine, at Mullan. The Vindicator has a surface exposure of high-grade ore showing a streak of ore some 8 to 12 in. wide for a distance of about 100 ft. The new owners are opening a lower tunnel driven many years ago. Prospects are promising for deep development in collaboration with the Lucky Friday.

★Silver Syndicate Mining Co. is opening the "Rambo" area, in the Chester vein 2,500 ft. west of present productive areas. Sunshine has diamond-drilled the vein system in this locality, and it is reported that the drilling indicates continuation of high-grade orebodies already discovered in other parts of the vein.

★Leasers again have started digging up river tailings with a steam shovel in the river bed below the Golconda mill, between Wallace and Mullan. Several carloads of high-grade lead and zinc concentrates were produced from this deposit last fall before freezing conditions stopped operations.

★Fire destroyed the compressor and other mine buildings at the Silver Cable mine, east of Mullan, early in July, and temporarily halted operations. The mine is under lease to the Hecla Mining Co., which is producing zinc-lead ore at the rate of 80 tons per day. A diesel compressor plant has been shipped from Hecla's Blue Moon zinc property, in California, to replace the burned equipment. Last year Hecla's profits from the Silver Cable operation totaled $79,818.22. Royalties paid for the ore enabled Silver Cable Co. to declare a dividend of 2c a share, totaling $25,000.

★Polaris Mining Co. has declared its second dividend for the year 1945 by authorizing payment of 10c a share, or $200,000, to stock of record on July 31. Dividend checks will be mailed Aug. 31. This brings the company's dividend payments this year to $400,000 and the total to date to $1,340,000. The company has suspended production from its original Polaris vein, and is now producing

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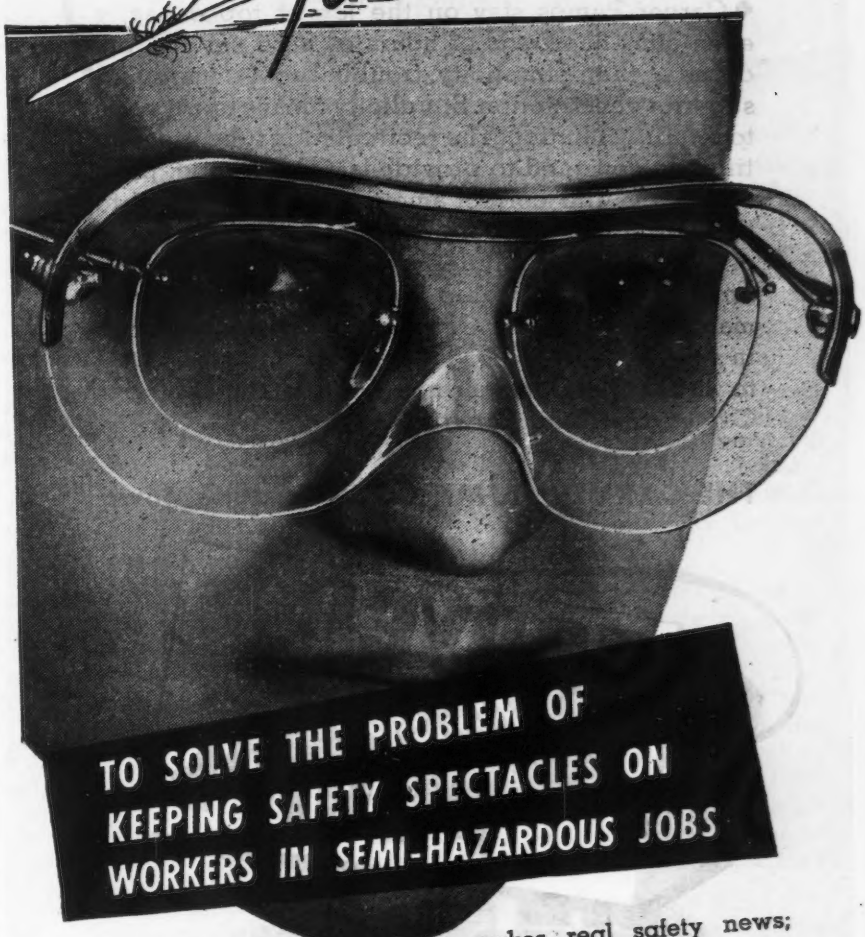

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Idaho *(continued)*

from the newly discovered Chester vein in equal partnership with the Sunshine Mining Co. This partnership agreement covers only what is known as the "Omega" area, a strip of territory embracing about 2,200 ft. along the strike of the vein. About 2,500 ft. east of this area, Polaris is sinking the Silver Summit shaft to a depth comparable to its rich "Omega" area, and will prospect the same vein and fault system in entirely new territory.

★The Lucky Friday Silver-Lead Mining Co. has driven a drift east on the footwall of its vein on the recently opened 1,000-ft. level, and has been in continuous ore for 100 ft. with a full face of ore in sight. A drift started west reveals similar conditions. The company has produced about 1,500 tons of high-grade milling ore from this development. Where crosscut on the 1,000 level, the vein and orebody was 20 ft. wide. The last shipment of milling ore of around 2,000 tons netted the company more than $30,000.

★Wallace people have incorporated the Lucky Friday Extension Mining Co. to prospect mining ground adjoining the westerly end lines of the Lucky Friday mine, at Mullan. Most of the treasury stock offered by the company has been subscribed for by local people. Development of the Extension property will be in drift work on the vein from the 1,000-ft. level in the Lucky Friday shaft. Lucky Friday will continue its drift development to its westerly end line, and from there on into the Extension property. Profits from any ore produced in the drift work will be applied on the cost price, and all possible ore production from the Extension ground will be divided on a 50-50 basis with the Lucky Friday Co.

★Callahan Consolidated Mining Co.'s second quarterly report for 1945 shows receipts of $53,739.49 for sale of ore during the period, compared with $63,469.98 for the first quarter. The reduced earnings are due to the fact that a shortage of available labor made it impossible to operate the mill on a full-time basis, according to Donald A. Callahan, president. Production is coming from the Rex vein, and diamond-drill operations are carried on in prospecting the company's adjoining Patuzent vein system.

CALIFORNIA

Two counties adopt resoiling ordinance—Kaiser Co. purchases iron-ore holdings

★The Division of Mines, Department of Natural Resources, Walter W. Bradley, State Mineralogist, reports that shipments of manganese ore dur-

ing 1944 from 67 properties in 20 counties amounted to 34,282 long tons of an average grade of 39.72 percent Mn, which recalculated to a basis of 45 percent Mn would equal 30,263 long tons volued at $1,097,655, compared with shipments from 58 properties in 24 counties in 1943 totaling 25,729 long tons, containing 45 percent Mn and worth $957,317. The 1942 production was 21,069 long tons, or 17,362 long tons if recalculated to a basis of 45 percent Mn, valued at $505,190. Average monetary return for ore shipped in 1944 was $32.02 a long ton f.o.b. mine, compared with $30.46 and $23.10 in 1943 and 1942.

★Chromite production in 1944 was 28,811 long tons averaging 48.58 percent Cr_2O_3, which recalculated to a basis of 45 percent Cr_2O_3 equals 27,900 long tons, with a value of $1,190,513, compared to 56,201 long tons containing 45 percent Cr_2O_3 in 1943 and worth $2,334,838. The 1942 production recalculated to a basis of 45 percent Cr_2O_3 amounted to 45,253 long tons valued at $1,741,080. Average return for ore shipped in 1944, 1943, and 1942 was respectively $41.32, $40.44, and $36.64 a long ton.

★Shipments of high-grade tungsten ore and concentrates in 1944 amounted to 203,965 units of WO_3, or 3,399 net tons of 60 percent WO_3 concentrates, valued at $4,835,810, compared to 254,118 units, or 4,325 tons of 60 percent WO_3 concentrates, worth $5,910,745 in 1943. Average returns per unit WO_3 shipped in 1944 and 1943 were $23.71 and $23.26. Output was contributed by mines in Fresno, Inyo, Kern, Madera, Mono, Nevada, Riverside, San Bernardino, and Tulare counties.

★A gold dredge resoiling ordinance with provisions similar to those of the bill introduced by Senator H. E. Dillinger, of Placerville, in the recent session of the Legislature, and subsequently defeated in the Senate, was adopted on July 2 by the El Dorado County Board of Supervisors. Stanislaus County already had adopted such a measure, and Sacramento County and Merced County are reported considering one. The ordinance requires dredge operators to resoil and level areas rendered unfit for agricultural purposes except where, in the opinion of the board, the present or provable future agricultural, scenic, or historic value of the land involved does not justify such work. Stream-bed operations are exempt if dredge operations do not result in diverting the stream course in such a manner as to damage other property. The ordinance became effective on Aug. 4. Applications for exemption must be made in writing and will be heard at a public meeting of the supervisors not sooner than 30 days after presentation.

★The Kaiser Co., operating the Fontana steel and iron enterprise in Southern California, has purchased from the Colorado Fuel & Iron Warehouse Co., Pueblo, Colo., eight iron mines in the Kelso district of San Bernardino County for a recorded consideration of $125,000. All properties are patented, lying contiguous to the Vulcan iron deposits furnishing feed for the blast furnace at Fontana. Mined ore is trucked to Kelso, whence it goes by rail to Fontana.

★Arrangements for testing old dredge tailings with a view of redredging the material if gold content averages 8c per cubic yard, have been made by A. J. Molinari and Alan Dunbar, who have recently leased about 150 acres of dredged land from the city of Oroville, Butte County, and private owners. Treated gravel will be handled in the Bechtel-Kaiser rock crusher near Oroville under lease to the partnership.

★Hecla Mining Co. is now producing 200 tons of zinc ore from its Blue Moon property at Hornitos, Mariposa County. The operating company is a subsidiary of Hecla, and is known as Red Cloud Mines, Inc.

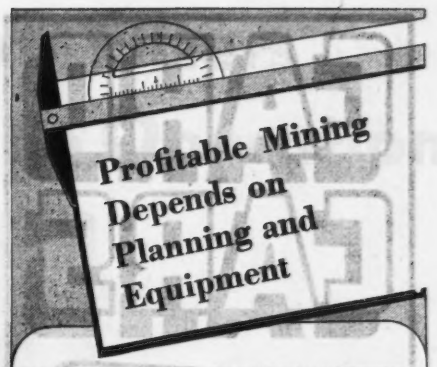
★Placer gold mining is gradually increasing in several Trinity County districts following removal of ban on gold mining. Hydraulic operations are expected to commence this winter in the Junction City, Weaverville, and other placer areas where some properties like the Bergin hydraulic mine, near Junction City, have been worked for more than 50 years. Placer ground covering some 55 acres on the North Fork of the Trinity River has been leased by A. F. Trubey from H. A. Spindler, and preparations for early production are under way. Chester A. Proebstel is moving equipment to a new placer site on Indian Creek, and Nevada mining interests are continuing test work on placer ground under option near Weaverville. Placer operations are planned in the New River, Lewiston, Minersville, and adjacent districts.

OREGON

Mining activites to increase in Baker County—Oregon senators fear loss of Salem aluminum plant

★U. S. Senators from Oregan are fearful that the State may lose the aluminum plant at Salem. WPB states that this plant is no longer a war necessity, and because of this ruling it is feared it will be difficult to obtain labor and essential materials. Director Nigel Bell has stated that the Aluminum Division has recommended to J. A. Krug, WPB chairman, that production at the plant be cancelled. Bell is endeavoring to have a directive sent to the plant to invesigate. Production at Salem was to have been started Aug. 1, but was indefinitely postponed.

★There are prospects of greater min-



The excessive requirements of four years of record breaking war production have left the plants of the mining industry in bad shape for competitive production. For lack of proper replacements, old and obsolete machines have been repaired and continued in service, others badly needing overhauling or replacing. Plants thus equipped are not capable of profitable operation when the industry turns from its war production basis to one of competitive costs and prices.

Reconversion for the mining industry must include plans for economy in operation. Successful operators will look to firms like Southwestern for the special knowledge to plan better ore treatment and handling methods, to locate required materials, manufacture or obtain the necessary new equipment and construct or rebuild their plants.

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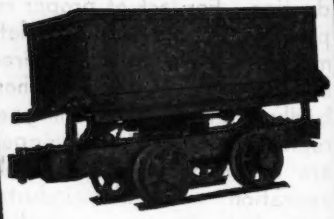

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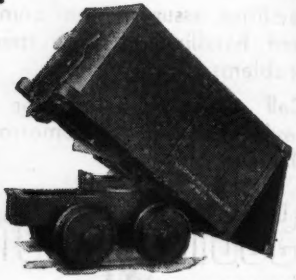


Ask for Catalog 40 — Today

A

C.S. Card Iron Works Co.
Denver, Colorado

Oregon *(continued)*

ing activity in Baker County. Tailings at the old Rainbow mine, in Mormon Basin, will be cyanided in a plant being installed by Gardner & Bradshaw, who have been successful in such operations at other points in eastern Oregon. Mr. Kapschull has concluded an examination of the Rainbow, and diamond drilling is being considered. Sumpter Valley dredge has reconditioned and modernized its dredge by installation of Pan-American jigs, which are expected to facilitate recovery of finer gold. Bodelson & Sammons are exploring a large acreage they control in the lower Sumpter Valley. This work has been in progress about eight months, and consists of shaft and drill work. Chadwell Brothers are reopening the Woodward property on east Eagle Creek. Work includes cleaning out old cavings and some new drifting. Anthony Bradenthaler reports that the installation of the new mill at his Grey Eagle antimony mine is about completed. He expects to resume operations in the near future. Ibex Mining Co., of Vancouver, Wash., is employing ten men at the company's mine and mill in the Cracker Creek district.

★H. P. Holsworth, of Seattle, expects to pump out his Oregon Almeda mine, flooded since 1942. Prior to that time he was shipping siliceous gold ore to the Tacoma smelter, and he expects to resume when materials and labor are available.

★Union Silver Mining Co. is installing heavier machinery at its Indiana mine, in the Camp Carson district of Union County. The company expects to do additional exploratory work. The ore contains lead, zinc, and silver.

★Owners are returning to their properties in the Greenhorn district of Grant County. Frank Klein is at the Golden Gate, Mr. Helmer at his Paramount claims, and Mr. Van Hallberg at the Banzette.

★W. B. Robertson has resumed diamond drilling at the Oregan chrome mine, on the Illinois River, following announcement that MRC will continue to purchase chrome ore until the end of 1945. D. C. Beyer has resigned as engineer in charge of MRC stockpile at Grants Pass.

COLORADO

Fairplay dredge running—New mill operating at Silverton—John Hamm enters placer group

★Test runs have been completed at United Production Co.'s new Lackawanna mill just outside Silverton, and production to the full present capacity is expected to begin soon. There are now about 2,500 tons of ore stockpiled, and the intent is to get 10,000 tons laid by before winter. Mill production, starting at 50 to 65 tons of ore handled daily, is expected gradually to be stepped up to about 100 tons daily. Ore is of the complex Colorado type producing lead zinc, copper, gold, and silver. It will come from the company's two producing mines, the Caledonia and the Burrows. An access road crossing the Animas River has been completed to connect the property with the highway.

★John Hamm Mining & Milling Co., Ltd., represented by George F. Schrieber, mining engineer, has purchased a part interest in the Cache Creek or Twin Lakes placer operation. The company bought one-fourth interest from Hugh C. McLean, of Buena Vista, and one-fourth from the Frey interests, of Granite, Colo. The placer claim amounts to about 2,000 acres, all in the Granite district.

★South Platte Dredging Co. has resumed operations of its placer dredge near Fairplay, and is again depositing gold at the Denver Mint. The dredge was built in 1941 at a cost of nearly $750,000, and had been at work a little more than a year when gold mining was banned. During the shutdown the company has gone ahead obtaining new ground, and now controls nearly 4,000 acres in the South Platte plain near Fairplay. It has also obtained some acreage on the Blue River near Dillon. The dredge found 18 men with whom to resume operations, and began in July. It can handle about 10,000 cu. yd. daily.

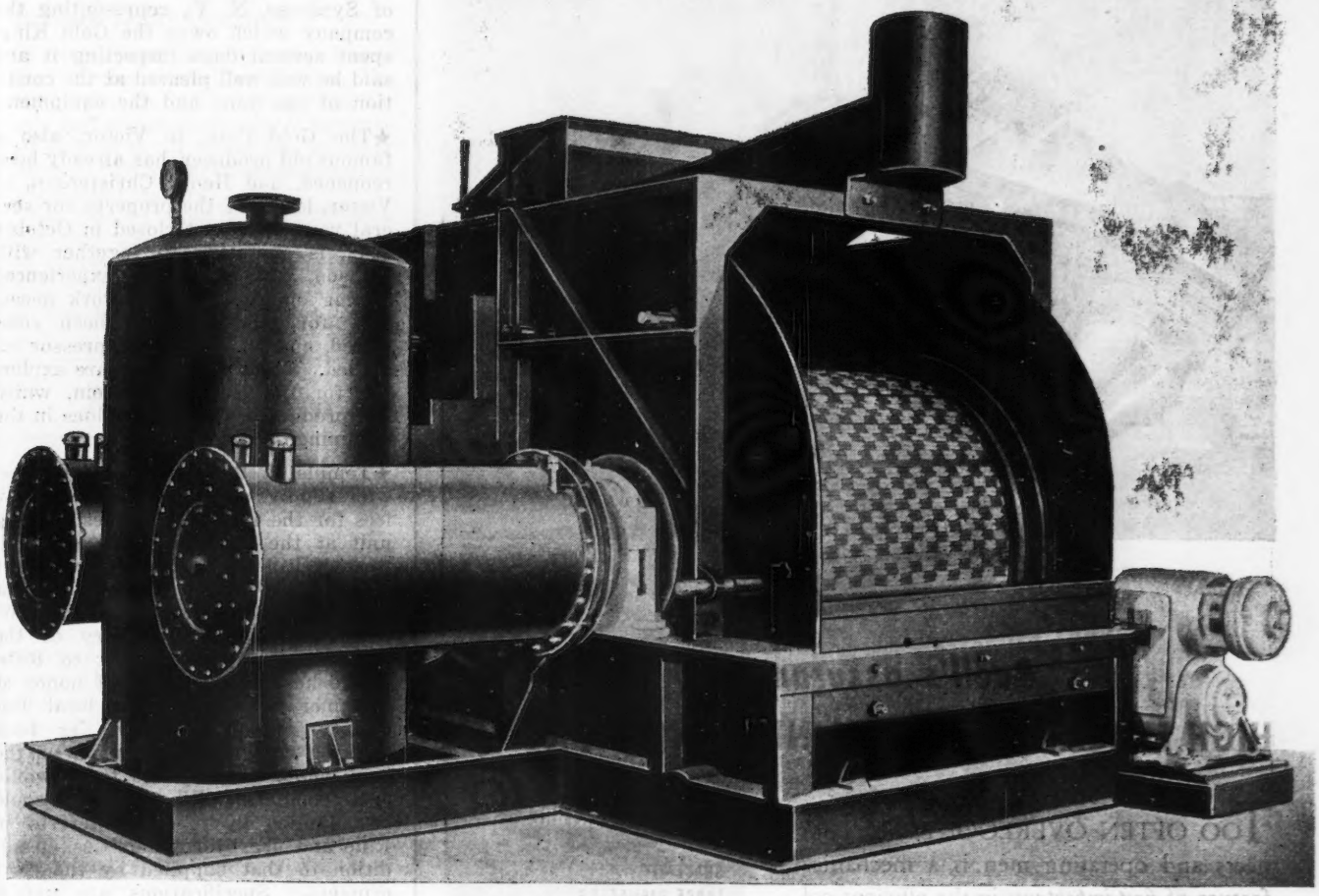
★Mine & Smelter Supply Co., of Denver, is entering its second half-century with excellent prospects, according to President Oscar A. Johnson. It was incorporated in 1895. Its business will increase rather than decrease due to a backlog of private orders which could not be supplied during the war, due to low priorities. The return of war veterans is awaited, and more men will be employed.

★At the Treasury Tunnel the manpower situation has improved so that three shifts are now working. The mill is in full operation, concentrating the copper-lead-zinc ores by selective flotation, with concentrates going to American Smelting & Refining Co. The 1,100-ft. raise being constructed is approximately half done, workers being about at the 500-ft. mark.

★American Smelting & Refining Co. has bought the mills of the California Gulch Mining Co. at Leadville and has remodeled the larger, which has a capacity of between 250 and 300 tons of ore daily, the smaller and older mill being held in reserve. The company mills ores for lead and zinc production from its own mine at Kokomo, the Lucky Strike, and in addition it mills those of other operators on a custom basis. The manpower situation is satisfactory.

★The Gold King mine, in Poverty

Peterson Syncro-Drum Filters Accomplish Two Jobs in One Operation



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This classification and filtration in one operation makes Peterson Syncro-Drum Filters applicable in many metallurgical processes where material containing 20% to 70% solids breaks into sizes from substantial percentage minus 200 mesh to 3 mesh or are rapid settling.

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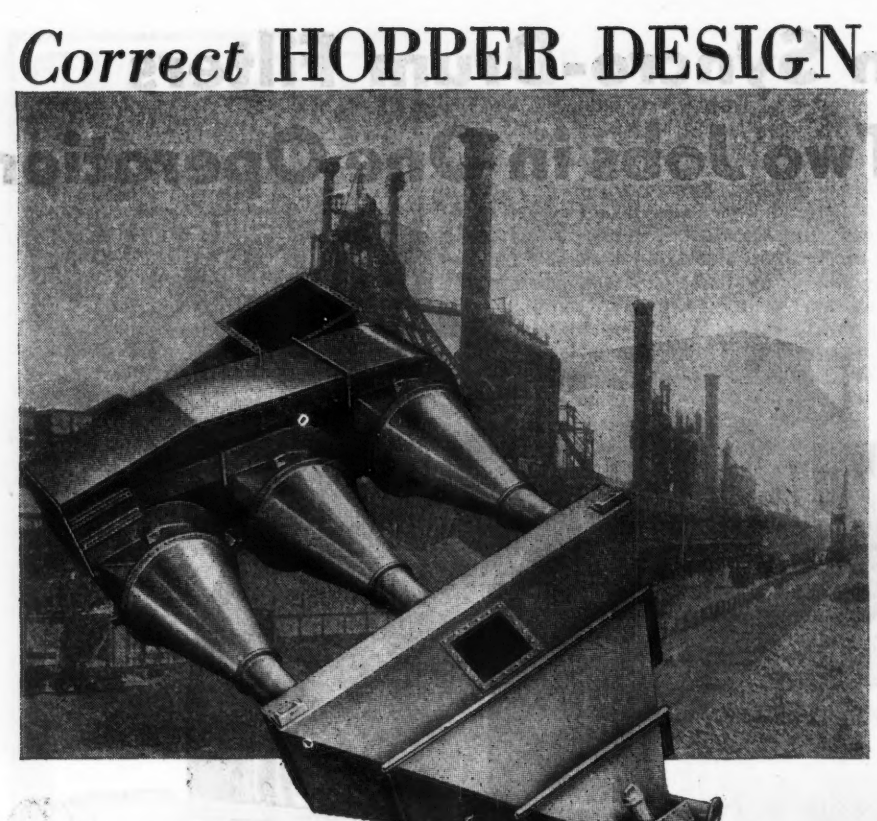

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Colorado *(continued)*

Gulch, near Cripple Creek, may be reopened on a full-production basis within the next few weeks. This is the original claim which Bob Womack staked in the discovery of the Cripple Creek field. H. A. Mollineaux, of Syracuse, N. Y., representing the company which owns the Gold King, spent several days inspecting it and said he was well pleased at the condition of the mine and the equipment.

★The Gold Coin, in Victor, also a famous old producer, has already been reopened, and Henry Christensen, of Victor, lessee of the property for several years before it closed in October 1942, is operating it, together with his son, Oliver, also an experienced mining operator. Shaft work necessary for reopening has been completed, and an electric compressor installed. The Christensens are exploring for the Newmarket vein, which has produced some good values in the adjoining Ajax shaft.

★Temple H. Buell & Co., of Denver, will supply architect-engineer services for the Bureau of Mines housing unit at the oil shale mine and mill west of Rifle. The quarters will cost about $240,000 and will house about 125 persons. However, Michael W. Strauss, assistant Secretary of the Interior, on a recent visit to Rifle, where he was the guest of honor at a dinner tendered by the local Tri-County committee which has been working with the Government on the huge shale project, said there would be a demand for all housing that could be supplied by private interests in Rifle and nearby communities, in addition to that supplied by the Government. Specifications are understood to be ready for the boiler plant, office building, and other structures at the mine.

★A complete survey of the postwar needs and possibilities of the Colorado mining industry is being planned by the Colorado Mining Association in co-operation with affiliated groups and bureaus, such as the Geological Survey, the Mineral Resources Board, the Bureau of Mines, the Reclamation Service, and others. The need for power and the possibility of a large power supply from the Colorado-Big Thompson, the Blue River, and other large transmountain diversions planned for the postwar period, will constitute one of the chief items of the study.

Kennecott Develops Lead-Zinc Property

Development work is in progress at the Oswaldo mine, a lead-zinc property in the Silver City, N. M., district, which is being opened up by Kennecott Copper Corporation. It was reported in July that a shaft on the property was down 475 ft. and underground development was proceeding. At that time, the crew had

worked 530 days without a lost-time accident. K. V. Harris is general mine foreman at the Oswaldo and Oliver Dougan is underground foreman.

New Mexico Bureau Studies Dust Control

In compliance with a recent enactment of the State Legislature, the New Mexico Bureau of Mines has begun a state-wide campaign to improve dust control in all mines and in other industries where dust constitutes an occupational hazard.

The Bureau also contemplates a state-wide mineral resource survey, with particular emphasis on gold prospects. These plans were hastened by the elimination of WPB order L-208.

ARKANSAS

Alcoa will bid for DPC aluminum plants—Batesville manganese production is now normal

★The Aluminum Company of America has announced that it desires to take over the Government-owned aluminum plants in Arkansas and operate them after the war. Robert A. Learnard, regional manager of the company's Arkansas operations, made this announcement on Aug. 6. He said the company would not acquire the huge Jones Mill aluminum plant unless it could buy or lease the Hurricane Creek alumina plant at the same time. The company has been operating these $80,000,000 war plants for DPC. Mr. Learnard said the company would buy the plants to continue their operation. Before the war Alcoa shipped its Arkansas bauxite to plants in other states to be processed.

★The Cove Creek Agstone Co., which recently started operations in the Magnet Cove area, is producing agricultural lime for distribution in 33 Arkansas counties. The material is mined from a calcite deposit occurring within the igneous intrusive at Magnet Cove.

★More than 25,000 tons of processed oil-well drilling mud is being produced monthly from the huge deposit of barite occurring near Magnet Cove. The Baroid Sales Division of National Lead Co., and the Magnet Cove Barium Corporation, are the two companies in production. Efforts are being made to get the open pits fully prepared to allow for full production throughout the coming winter. The Magnet Cove company has purchased a Sullivan H-22 diamond drill and plans to drill its property thoroughly to gain needed information to prepare plans for future underground mining. O. J. Benston is general superintendent for National Lead, and Harry

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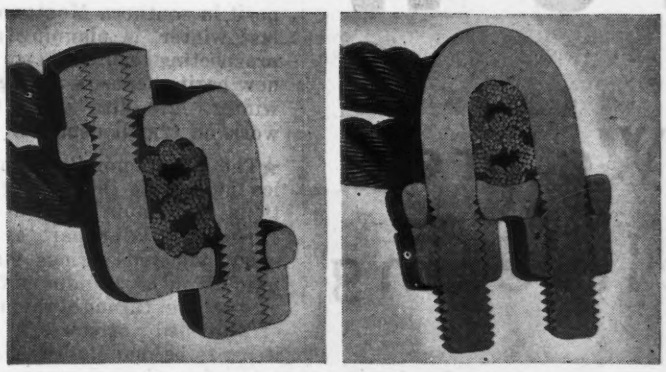

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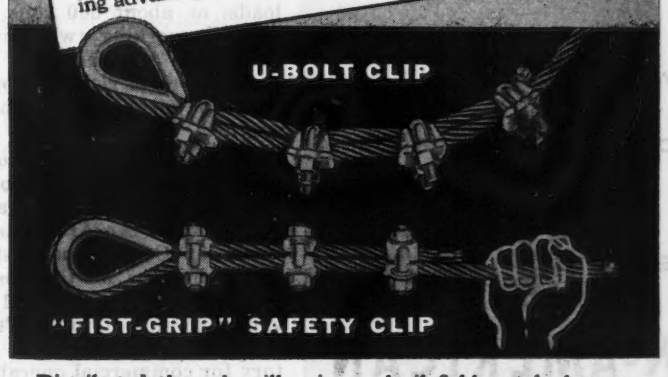

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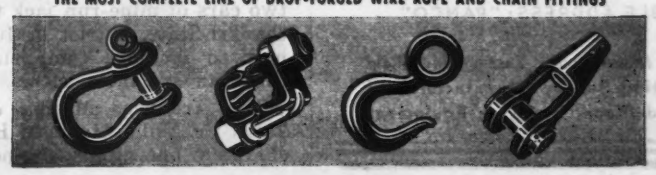

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Arkansas (*continued*)

Brown is president and general manager of the Magnet Cove Barium Corporation.

★Leo Yount, of Glenwood, who discovered the Gap Mountain barite deposit in southern Montgomery County last winter, is planning an intensive prospecting campaign to search for new barite deposits during the coming winter. He also plans to do some work on tripoli deposits.

★The Aluminum Company of America put on an interesting and educational aluminum show in Little Rock during the later part of July. The show depicted various stages in the production of aluminum from mining of the ore through the manufacture of finished products. Many new items to be manufactured from aluminum after the war were shown.

★A number of the smaller mine operators in the Batesville-Cushman manganese field have suspended operations and do not know when they will resume. Production in the field in July nearly doubled that of June, because dry weather greatly improved mining conditions. Total production in the field in July ran to 1,120 tons, against 670 in June. Six hundred and ten tons of the July production was low grade and 510 tons high grade. August production will probably exceed that for July. The Metals Reserve stockpile of high-grade ore in the district are increasing every month. There is an excellent demand for low-grade ore.

★S. & G., Inc., operating the Hurricane mine, in Searcy County, produced two cars of high-grade carbonate of zinc ore in July and one car early in August. Ore shipments go to the New Jersey Zinc Co. Total shipments since the mill was put into operation last winter run to 12 carloads, or about 600 tons. The company is working two shifts, and its production will increase late in the summer. Mill repairs stopped operations for about a week the middle of August.

★W. N. Hudson and associates, who have leased the Jameson property on the 10 O'clock Run near Hollister, Mo., close to the Arkansas State line, in Taney County, have started mining operations on the Josie B. The old shaft was down to 110 ft. They expect to sink it to 200 ft., drift and cross cut, and if the ore is satisfactory for commercial operations to construct a big mill.

★William McCurry and Pete Wells, who leased the Jack Pot mine, in the Zinc, Ark., district, have recently leased the Virginia J., and have both mines in operations. They shipped two cars of mine-run jack to a firm in the Tri-State district in July and expect to increase their shipments if they can get more men.

★The Arkansas Mining & Refining Trust Co., John Stone, of Harrison, in charge of operations, shipped two cars of mine-run jack to a Tri-State firm in July. The company recently sank a small shaft 15 ft. deep in the floor of its main tunnel and encountered good ore all the way down. It also operates the North Star mine, near Harrison.

MISSOURI

U.S.B.M. explores with geophysical equipment and churn drills —state mines report issued.

★Non-metallic mineral substances and products continue to be economically important, and offer possibilities for the development of industries in Missouri. Numerious inquiries are being received by the various State and Federal agencies concerning the occurrences of barite, pyrites, silica, sand, and limestones. Requests for information on limestones which can be suitably used for quicklime, railroad ballast, concrete aggregate, rock wool, and the like are particularly numerous.

★The Missouri Geological Survey has issued Volume 30 of its second series of bulletins describing the Pyrites deposits of Missouri. Ninety-one pyrites properties and prospects are described in the publication. Spectroscopic analyses of minerals which occur in the pyrites bearing filled-sink deposits are offered and a total of 42 mineral varieties are discussed in detail. Dr. O. R. Grawe is the author of this volume, which may be procured from the Missouri Survey offices in Rolla.

★It is reported that several of the large clay companies operating in central Missouri are conducting research on different refractory products. Sillimanite deposits particularly are being sought and studied for possible exploitation as refractory material.

★The exploratory drilling for zinc by the U. S. Bureau of Mines at the Alice mine property, near West Plains is nearing completion. Three churn-drill holes have been finished to date. The North Range Mining Co., a Michigan concern, drilled four holes on the property about a year ago. Neither the data obtained by this company nor those resulting from the recent drilling have been released for public use.

★The Geophysical Division of the U. S. Bureau of Mines is carrying out geophysical tests on properties of the Fredericktown Lead Co., and of the Park City Consolidated Mines Co. Testing is by magnetometer and resistivity depth measurements.

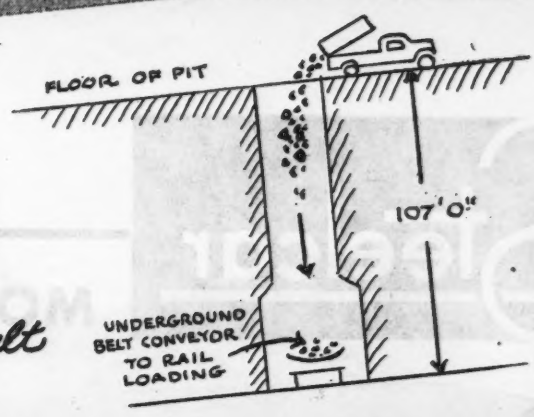
★The fifty-seventh annual report of the Missouri Department of Mines and Mining has been published. It gives complete statistics on the more important mineral products taken from Missouri in 1944.

the Problem —

① *to lower ore from floor of open pit mine to underground belt conveyor*

② *Feed uniform volume to belt conveyor*

③ *Avoid damage to conveyor belt*



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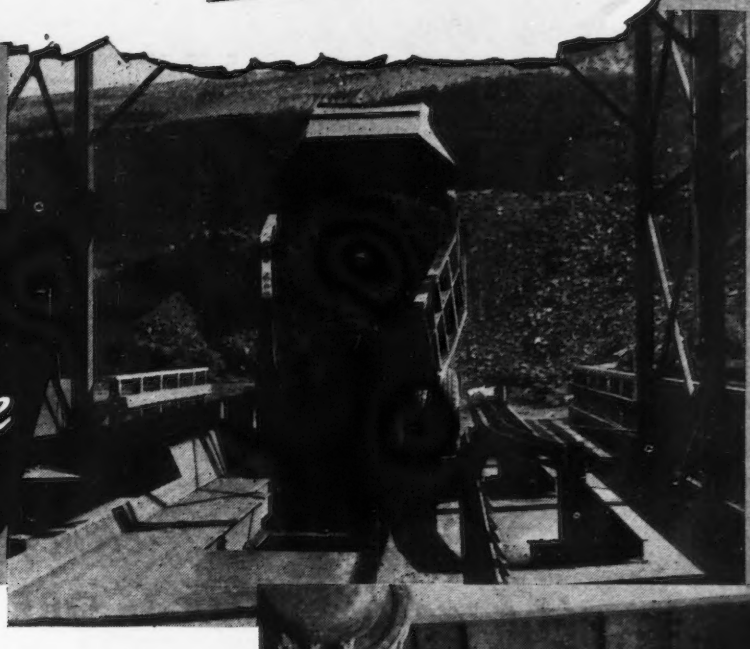

20-ton truck dumping ore to S-A Manganese Steel Feeder 107 feet below.

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Photo of Feeder at bottom of 10′ x 10′ raise.

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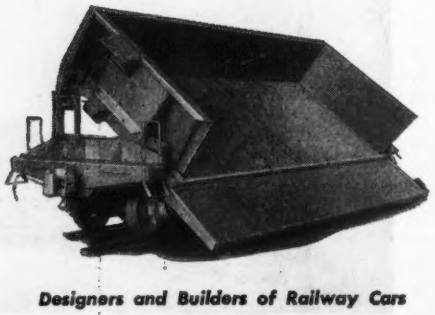

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TRI-STATE

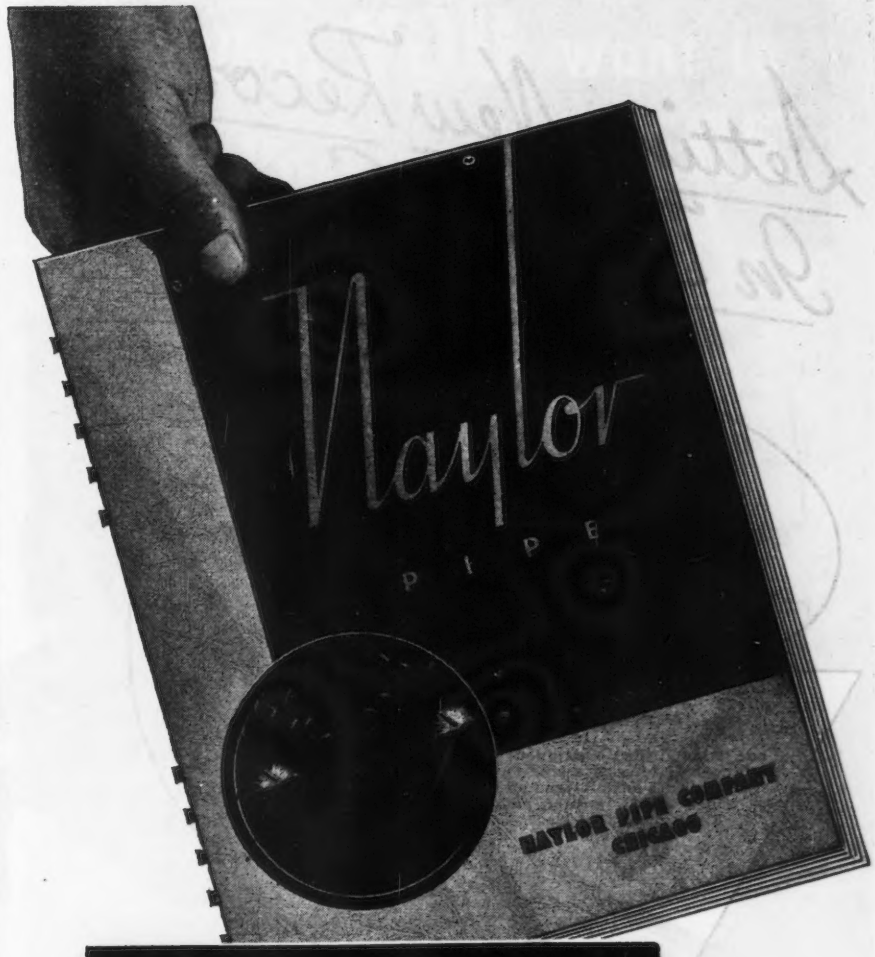
Eagle-Picher reopening Foley mine —WLB grants pay increase to Federal company employees

★Eagle-Picher Mining & Smelting Co. is sinking a new shaft on the north end of the Foley lease, north of Picher, in Kansas, where the company has been conducting an extensive drilling campaign the last several months. The shaft, the site of which is about 700 ft. north of the old Foley mill shaft, will be put down to a depth of 455 ft., according to S. S. Clarke, of Baxter Springs, general mine superintendent for the company. A 12-in. drill hole is being put down about 8 ft. south of the shaft for the installation of a pump to handle water encountered in the sinking operation. Sinking derrick and transformer house have been built at the new shaft site, and an air line has been extended from the company's West Side mine, which adjoins the Foley on the south. An "orange-peel" shovel is being used to muck out the old Foley mill shaft, which has been repaired to the 200-ft. level, and is 286 ft. in depth. This shaft will be continued down below the 400-ft. level, Clarke said. A derrick already has been built at the shaft, and other mining equipment will be installed as development progresses. The new development on the Foley, and the drilling being done by the company in the vicinity, are extensions of the great Picher field to the north, with the same ore formation and horizon at a lower depth. The company has been operating as many as seven drill rigs in the area, extending nearly a mile from the old Kansas Explorations Jarrett across the Foley and Mullen leases to the northeast.

★The Murray brothers—Charles, Jesse, Walter, and Ralph—of Galena, who operate the Murray-Davis mine, on the old Southside mining tract, have purchased the interests of H. W. Williams, Don Gaede, and E. A. Gaede, also of Galena, in the Mess Cave Mining Co., which operates an open-pit mine on the old Windsor Lead & Zinc Co. land in the Short Creek bottoms at Galena. Cecil L. Largen, of Picher, and Marvin Robinson, of Galena, are retaining their interests in the Mess Cave property, and, together with the Murray brothers, will be in charge of future operations of the company. The company has been operating a ⅜-yd. dipper-type power shovel in the open-pit mine, and has a roadway down to the 35-ft. level. Previous drilling indicated a 20-ft. face of 6 percent zinc ore above the 95-ft. level, which is 55 to 75 ft. below the collar of the old Mess shaft, according to Robinson. Partners in the reorganized company will install a 5-in. Pomona pump to dewater the ground and open up the

lower run of ore, Robinson said. Pumping by Eagle-Picher Mining & Smelting Co. at the Big Murphy, Hot Spot, and Illinois stations, together with that of the Galena Mining Co. on the Southside tract, take the head off the water in the creek bottoms. Largen and F. O. Rosenberg are operating a 1½-yd. dragline in stripping operations west of the Windsor property. William Bradshaw and associates are working a mine on the Rumery lots, west of Main St. between the Frisco and Katy railroads. Charles Anderson and associates have opened a mine west of Main St., between First and Second Sts. The latter two groups are working their mines on the 40- and 65-ft. levels, respectively. Ore from the Short Creek bottom operations is trucked to an unloading ramp on the old Memphis branch of the Frisco railroad, north of Short Creek and about a quarter mile west of Main St., from where it is shipped to the Eagle-Picher Central mill, in Oklahoma. Ore from the Eagle-Picher and Galena company operations in the Galena area also goes to the Central mill.

★The Little Pat Mining Co., which opened an exceedingly rich zinc-lead mine a year ago on the Missouri Zinc & Lead Co.'s land near Twenty-second and Wisconsin Aves. in Joplin, has opened a second shallow bonanza near the initial one. A drill hole was put down about 50 ft. south of the first shaft, which disclosed a run of lead ore averaging about 10 percent in recovery values from the 42 to 47-ft. levels, and nearly 40 percent in blende recovery values from the 52- to 58-ft. levels, according to W. D. Brittain, of Joplin, one of the three original partners. A new shaft was sunk about 25 ft. west of the drill hole, in which ore was struck at the 40-ft. level and continued down to the 70-ft. level. A drift has been cut out in ore from the shaft on the 65-ft. level to a point about 10 ft. east of the drill hole. In driving the drift through the ore, the heading was gradually widened until now the face of ore at the present heading is about 8 ft. wide and nearly twice that in height. Charles Roberts, a veteran soft-ground miner, who now has an interest in the company, has done an exceptionally good job in timbering the ground. Approximately 300 tons of ore, or perhaps a much larger tonnage due to its high mineralization, has been dumped on the surface from the shaft sinking and driving of the one comparatively small drift. Most persons who have viewed the pile expect it to go nearly as high in recovery of blende as did the first milling of ore from the initial shaft, which resulted in a recovery of approximately 37.5 percent of high-grade blende. The ore is to be milled over the custom mill of the St. Louis Mining & Milling Co., northwest of Joplin near the old Thoms Station mining area. George Minshall and Harold Andrews, both of Joplin, who



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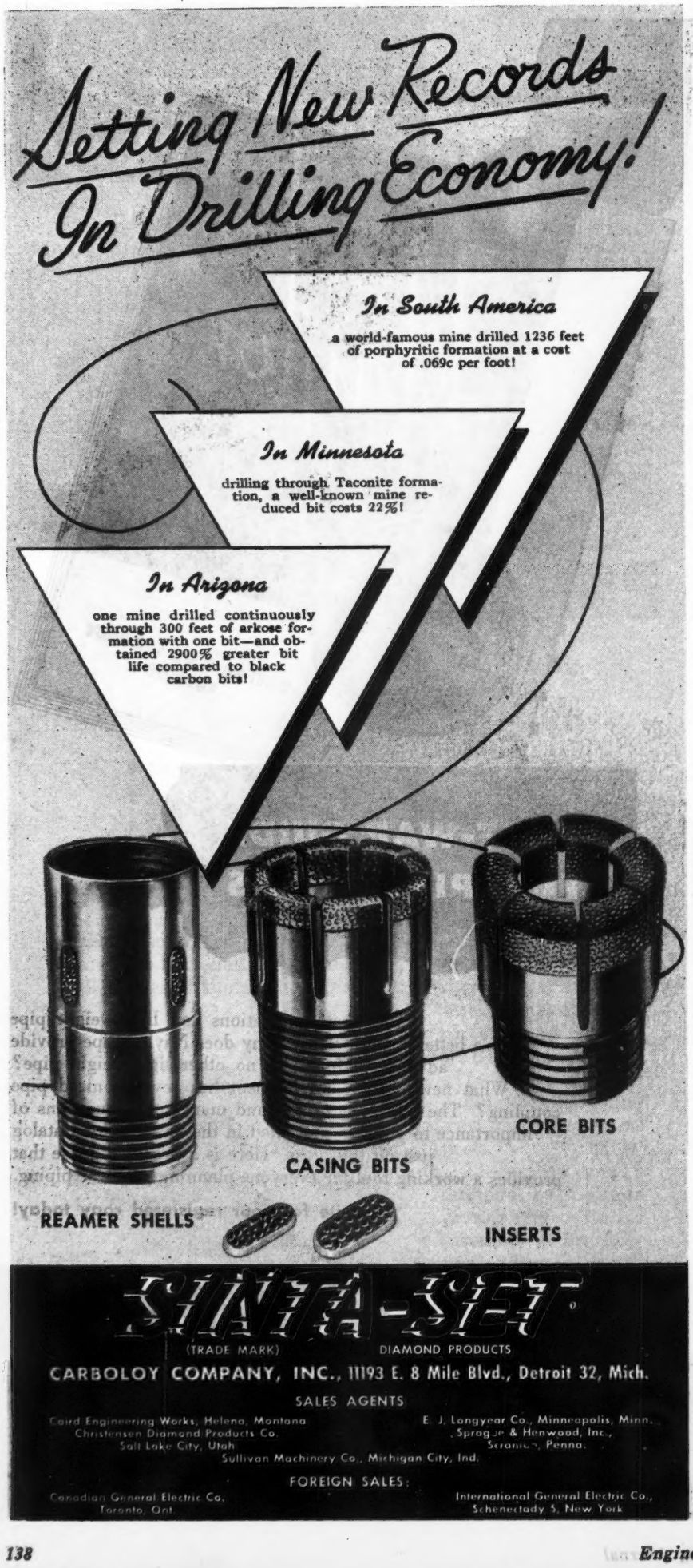
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Tri-State *(continued)*

were associated with Brittain in the original discovery and development, together with Minshall's son, Hazelton, and Roberts, now compose the partnership. The elder Minshall did the drilling on the lease, which led to the discovery and development of the rich mines.

★Frank Webster, of Miami, and Owen Thompson, of Baxter Springs, have taken a lease on 37 acres of the Swartz land in the old Lone Elm mining area, bordering Turkey Creek northwest of Joplin, and are operating two power shovels in a stripping operation there. With the removal of overburden, around 125 tons of ore from the shallow deposits will be treated per shift over the Swartz mill, according to Andrew Swartz, who is a son of the late Peter L. Swartz, in whose family the property has been held for a long period of time.

★Southwest Mining Co. has finished sinking the old K. D. F. mine shaft to the 250-ft. level, after installing a second 7-in. Pomona pump for dewatering the ground. The pump was installed in a 16-in. drill hole put down about 40 ft. from the shaft. The shaft was deepened about 25 ft. Operation of the K. D. F. mine, which is on the Dr. Myers land, goes back to Civil War times. During the present war, the Southwest company has operated the mines and built a mill on the property.

★In a decision handed down by Regional War Labor Board No. 7 at Kansas City, Mo., in a labor-management dispute case between the Federal Mining & Smelting Co. and the International Union of Mine, Mill & Smelter Workers Union (CIO), involving 385 employees in six mines of the company in the Tri-State district, the board approved agreement of parties on inclusion in their contract of the standard voluntary maintenance of union membership and check-off; directed night-shift pay premiums of 4c an hour for the second shift and 8c an hour for the third shift, industry members dissenting; directed wage increases ranging from 5c to 55c a shift for 17 job classifications; directed a rate of $7.55 a shift for machine men, a raise of 50c per shift; denied the union's request for an additional 25c per shift for machine man and helper when doing their own powder work; denied 50c a shift additional pay for machine man and helper when a post of 10 ft. or more in length is used, and directed that slicker clothing be provided by the company in accordance with previous practice. The pay increases are effective retroactive to Sept. 29, 1944, which is the expiration date of a previous contract between the company and the union. Since the company has appealed the increases, they must be approved by the Office of Economic Stabilization before becoming effective.

MICHIGAN

Copper subsidy extended one month—C&H plant recovers secondary copper

★Subsidy prices for copper produced by the Copper Range, Quincy, and Isle Royale companies were terminated as of Aug. 1, but an extension of one month was granted when it was announced that the mines would be compelled to close throwing approximately 1,700 men out of employment. The situation is being further studied, and hope for a further extension is held.

★Most of the secondary copper handled by the Calumet & Hecla plants is of the industrial variety. Much of it comes from material scrapped in the making of munitions or damaged in service. Some of it consists of heavy cable such as is used in wiring battleships. Telephone wire used by the Army Signal Corps is another fruitful source of secondary copper, some of it recovered from battlefields. Secondary copper activities are not limited to war-time scrap but also include such standard items as trolley wire and bars.

★Because the ammonia leaching process is particularly adaptable to mixed materials such as steel and copper or tin and copper, scrap of the latter kind is being treated at the Tamarack plant. Tinned copper wire, copper-clad steel wire, and motor parts are being leached in quantity.

★Both Nos. 3 and 4 shafts at the Ahmeek mine of Calumet & Hecla now are on a two-shift basis instead of three. The Central exploration in Keweenaw County is the only underground operation still working on a three-shift basis.

★A drill extractor is being used successfully in shaft work at the Allouez mine. The device consists of a bushing attached to the chuck of the drilling machine which rotates with the drill and makes it possible to retract the drill from the hole without the necessity of using a drill wrench.

IRON COUNTRY

Powdered iron plant planned for Mesabi Range — NLRB orders wage adjustments in Lake Superior district

★Expenditure of $300,000 for an experimental powdered-iron plant to be built on the Mesabi Range has been approved by the Range Resources Commission. The powdered-iron project is one of the avenues for possible use of the enormous low-grade iron deposits of the State. The plant will use iron carbonate slate, from which an iron powder of great purity

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Iron Country *(continued)*

is extracted. Such powder may be pressed and sintered into machine parts and tools with the strength of steel. The process for making the iron powder was developed by C. V. Firth, of the University of Minnesota School of Mines. The process has not been patented, as the United States Patent Office holds that it consists of a series of known chemical processes. According to unofficial reports, the pilot plant, which will employ about 40 men, will be built on the east end of the Mesabi Range, because of the presence there of the iron carbonage slate. The Continental Machine Co., of Minneapolis, Minn., is expected to operate the pilot plant for the State during the testing of the new process.

★Oliver Iron Mining Co. recently signed an agreement with the CIO locals according to the report of Sam Swanson, CIO representative of Hibbing, who met with Oliver officials in Duluth. The agreement reached by the Oliver Iron Mining Co. and the CIO locals includes provisions for vacation pay allowances given for one week after one year's service and two weeks, given following five years' service. Wage inequities regarding increases in certain classifications of jobs were settled and better hours of work have been given employees in the new agreement. The shift differential for work performent on the second and third shifts was granted, and all provisions are retroactive to Jan. 1, 1944.

★Consumption of Lake Superior iron ore during June amounted to 6,397,091 gross tons, which compares with 6,872,461 gross tons in May, and 7,112,060 gross tons in June 1944. The consumption for the first half of 1945 amounted to 40,346,303 gross tons, for the same period in 1944, 44,290,230 gross tons. Stocks of iron ore on hand July 1 at furnaces and Lake Erie docks were 24,847,472 gross tons, against 26,655,414 gross tons on July 1, 1944. The statistics are compiled by the Lake Superior Iron Ore Association, of Cleveland.

★The first cargo of iron ore was loaded out from the new iron ore dock at Port Arthur, Ontario, on July 21. The "Marquette," of the Cleveland-Cliffs Iron Co. fleet, had the honor of taking on the first cargo. The new ore dock is owned by the Canadian National and was built to handle the iron ore produced by the Steep Rock Iron Mines, Ltd., of Atikokan, Ont.

★As reported by the statistical office of M. A. Hanna Co., vessel agents, the iron-ore shipments from Lake Superior ports for July totaled 11,372,282 gross tons, bringing the cumulative figure for the season to 40,396,868 gross tons. This shows an increase over June, which was 10,621,309 gross tons, but is less than for July a year ago—12,908,972 gross tons. A new shipper, Port Arthur,

Ont., responded with 13,978 gross tons, over its new dock built to take care of ore from the Steep Rock mine, in Ontario.

★About 20,000 miners in the Lake Superior district, including 2,500 on the Marquette Range, will benefit from adjustments in wages based on an order from NLRB retoractive to Jan. 1, 1944 granting miners 5c per hour more on the afternoon and night shifts than on the morning shift. The second item on the order covered holidays. Retroactive to Jan. 1, 1944, six holidays per year are considered work days whether worked or not, giving the miner a chance to draw time and a half for Saturday. Each man is granted one week's vacation, with pay, after working one year; and two weeks' vacation after five years' work.

★Many improvements have taken place during the first six months of the year at the "Book" mine, near Crystal Falls, Mich. Besides changing over from open-pit to underground operation by installing 4-ton skips in balance operating on an incline railway of about 30 deg., and dumping into a pocket on the north bank of pit, a crushing and concentrating plant was built good for 20 tons per hour. The crude ore is moved by Koering Dumptor 10-ton trucks from skip pocket to crusher pocket, where it is reduced to ⅝-in. size with a 3-ft. cone crusher. A conveyor belt elevates the crushed ore to the top of Jig plant, where it is fed to three Bendelari jigs. The concentrate from these is hauled by the same trucks to railroad cars, and the chats or discard is stacked by belt conveyor in a pile still further to the north. A combination engine house and change room was built of wood that houses the 150-hp. motor electric hoist operating the skips in balance and two 500-cu. ft. per-minute electric compressors. R. S. Archibald is manager of this property.

★At the new Mather mine, at Ishpeming, Mich., arrangements are being made to enlarge the permanent stockpiles by changing two of the nine holes of the Wawonowin golf course next door, and making room for at least a million tons storage. Though production to date has not exceeded 20,000 tons per month, due to scarcity of men and preparatory work necessary to get the deposit into production, as soon as the war is over the rate should increase rapidly until the anticipated 130,000 tons per month is reached. Because of the sticky ore encountered, the angle of storage pocket chute plates was increased and air vibrators were added to the sides to keep the ore moving. Joe Haller is superintendent.

★The Iron Range Resources and Rehabilitation Commission has allocated $25,000 for the erection of a pilot plant to test the hydraulic gathering, drying, and processing of Minnesota peat to make fuel containing 30 percent moisture or less. It is expected that the plant will start operating next spring. If the project is successful, it is estimated that Minnesota will be able to supply peat for fuel at a production cost of $2 per ton on a large scale, and about $3 per ton on a small scale. Tests to process peat have been under way in a laboratory set up by O. A. Sundness, general superintendent of the Snyder Mining Co., at Shenango Location, on the Mesabi Range.

North Carolina Agency Sells Mining Equipment

★Three hundred sets of mining equipment owned by the Colonial Mica Corporation, of Asheville, government buying agency, and leased to miners in western North Carolina for two and one-half years, were placed on sale at Spruce Pine, N. C., Aug. 10, under the direction of C. E. McCallum, district head of the Smaller War Plants Corporation. The equipment was recalled from the miners last winter when the Government stopped purchasing green mica, and has been stored at Spruce Pine since that time. Each set consists of a compressor drill, hoist, pump, pipes, rail, mine cars, lubricator, lack-leg, ventilating unit, and light plant. They are being disposed of for 60 percent of the original cost, and miners purchasing them must sign a statement that the equipment is being purchased for mining and not for re-sale.

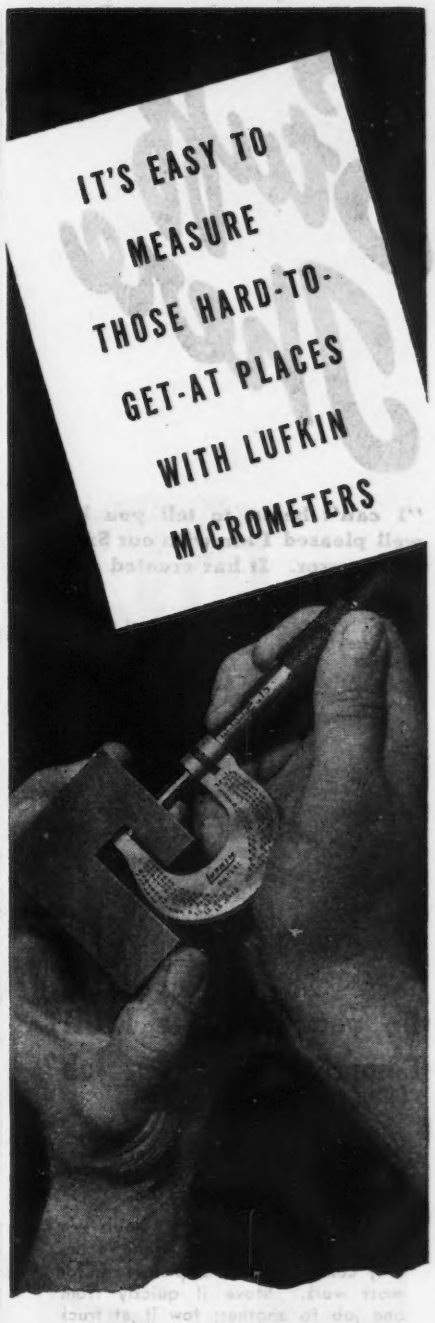
It has been estimated that 1,000 miners will go back to work in western North Carolina after the equipment is purchased by private operators and placed in operation.

ALASKA

Miners ask for stripping and drilling equipment—USGS discovers lode gold deposit

★Interest in lode mining is evinced by the purchase of the Primrose group of claims by Denali Development & Mining Co., of Fairbanks, from O. B. Hubbard, of Seward. The property, consisting of lode claims and mining and milling equipment, lies 14 miles north of Seward, and is connected with the Moose Pass Highway by a 4-mile cat road. A limited tonnage of high-grade ore has been shipped and milled, but no work has been done on the property since 1937. Systematic development is planned by the new owners.

★The Falls Creek Mining Co., Art Liening, manager, has purchased the Skeen Lechner property, near Mile 24, on the Seward-Moose Pass Highway. The property has been equipped with a small sawmill, bunkhouse, and mill building. The 40-ton mill is



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Alaska *(continued)*

expected to be placed in operation the latter part of August.

★George Lindsay has three men working on the Patsy Lea claim, which is adjacent to the Oracle mine at Mile 46, on the Moose Pass Highway. Ore is being milled in the Oracle mill.

★The Hershey mine is owned by Elwyn Swetman, of Seward. The property has been one of best producers in the Seward district, and is at the end of the Moose Pass Highway. The mill, consisting of five stamps and concentrating tables, was severely damaged in a snowslide this past spring. Three to four men are working on the property this summer, and development work is being contracted.

★A lode deposit containing free gold has been discovered by Robert E. Wallace, of the U. S. Geological Survey. The quartz stringers are on a divide between the Tuluksak River and California Creek about three miles from Nyac, a town on the lower Kuskokwim district. Placer deposits are worked in this area, but this is the first discovery of a gold-bearing lode deposit. The extent of the deposit has not been determined.

★In an address before the Fairbanks Chamber of Commerce, Glenn Carrington declared that miners must have a chance to do preliminary drilling and stripping to be in a position to operate when the war ends. Arthur Hedgers, head of WMC of the Territory, agreed with this position. Carrington said that it was important for the Chamber to have a definite postwar program to offer to the congressional committee which was to visit the Territory. "Mining is the basic industry of the Alaska interior and should not be forgotten," Carrington said. "The Fortymile, Chena Hot Springs, and the Haines roads should all be included in the program." Carrington had just returned from arguing the miners' case before government agencies in Washington, D. C., and he also addressed the Alaska Miners' Association. He said apparently the work the Army is still doing overseas would end the idea that the victory in Europe would release dirt-moving machinery that could be used in mining. The government heads, he said, seem to be in sympathy with the miners, and that the Wage and Hours Bureau is supporting the miners' campaign for uniform board bills, uniform statute of limitation on wage suits, and seasonal exemptions for mining operations.

★The U. S. Geological Survey estimates 2,600 flasks of quicksilver as probable in the lode mining claims under lease to the Decoursey Mountain Mining Co. on the Kuskokwim River. The Survey reports that this amount of quicksilver is in ore that assays 25 lb. or more per ton. In addition, it estimates 1,000 flasks are in ore assaying 10 lb. per ton.

★Roy B. Earling, vice president and general manager of U. S. Smelting, Refining & Mining Co.'s operations in Alaska, states that lifting of the ban on gold mining will not have much, if any, effect on mining in Alaska this year, due to lack of manpower and equipment. The company is operating only one dredge, the Cripple unit.

★Yukon Corporation, of Fairbanks, is exploring several gold properties it has acquired in Alaska and which it feels can be placed in operation in 1946 when men and machinery will be available. C. A. Sherman is chief engineer. The company has acquired from Peter Anderson four miles of placer ground on the upper Totatlinka River. It also has acquired placer ground on Fortymile River from Dale Applegate; twelve miles of placer ground on Birch Creek from Victor Hugo; the Glacier mine, 3,500 ft. up Mt. Hayes, which will be a hydraulic operation; and 16 lode claims on Eva Creek near Ferr from Miss C. C. Heid, of Nenana. The company expects to operate with dragline and bulldozer instead of using a dredge.

★Fritz Awe is actively engaged in mining at Chicken, 11 miles from Flat, and Pete Miscovich is also mining in that district.

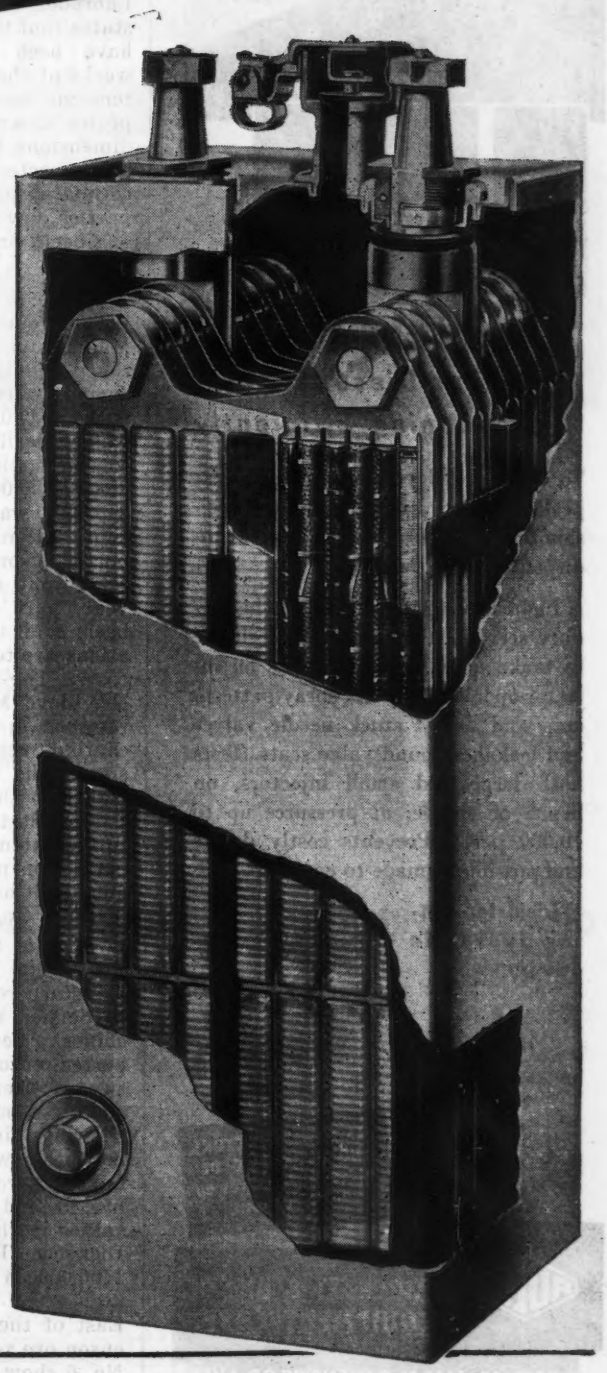
CANADA

Dominion Magnesium plant purchased from Canadian Government—Prospecting expands Ontario and Quebec camps

★Development of the atomic bomb has been dependent on Canada as a source of the uranium used, the Eldorado mine, on Great Bear Lake, Northwest Territories, being the world's major source of radium and its derivatives. Some time ago an Order-in-Council provided that rights to the mineral found in the Yukon and Northwest Territories should revert to the Crown. The Provinces, according to Munitions Minister C. D. Howe, have cooperated with the Dominion in controlling uranium supplies. Quebec, British Columbia, Saskatchewan and Manitoba have acted to take over all rights to pitchblende and other sources of radium and uranium.

★After tight control, since September 1939, of Canadian base metals, it was announced in the week of July 23 by the Metals Controller at Ottawa that most metals have been placed on an open-market basis. The only critical items remaining are tin, cadmium, antimony, and bismuth. Minor controls remain for fabricators of nickel, copper, zinc, and lead, requiring that inventory positions be report-

MOST RUGGED OF ALL



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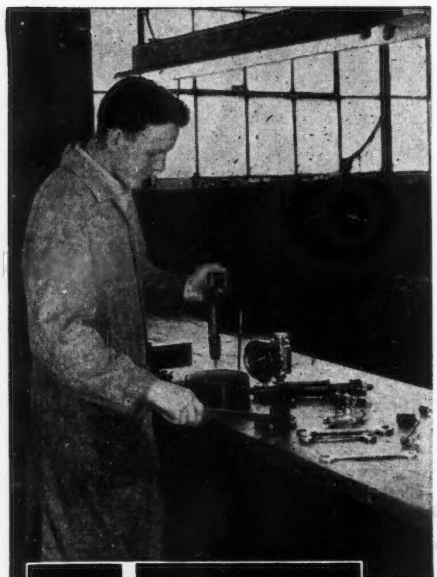

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Canada *(continued)*

ed at regular intervals. Lead consumers are required to restrict purchases to needs for a 60-day period. Certain controls will be required for the postwar period of reconstruction, when the office of Metals Controller is expected to be taken over by the Department of Reconstruction. In the period from 1936 to 1942 Canada used only 20 percent of domestic copper produced, 1 percent of the nickel, 17 percent of the lead, and 13 percent of the zinc. The prospect has improved for greater Canadian metal consumption for manufactured products in the postwar years.

★Dr. J. E. Retty, chief geologist, Labrador Mining & Exploration Co., states that new discoveries of iron ore have been made in the first six weeks of the current field season. Extensions have been made to the deposits described last year. Larger dimensions both in length and width are expected to increase the tonnage estimates previously recorded. Field parties now number 45 men, including engineers and trained prospectors.

ONTARIO

★The property and plant of Dominion Magnesium have been purchased from the Canadian Government and the company treasury has been supplied with $2,000,000. Half this amount was subscribed by Moneta, Bobjo, and Ventures, the latter providing an additional $600,000. The remainder of $400,000 was secured through public subscription. Arrangements were reported in progress for the sale of total output in Britain. For the past year, part of the plant output has been sold to U.S.S.R. Plant alterations are to be made to secure lower costs. The process was originated by Dr. Lloyd M. Pidgeon, who has been retained in a consulting capacity to continue research at Toronto University. The company holds exclusive rights to the Pidgeon process in the United States and Canada and plans to file patents in other countries. The extraction plant is at Haley's Siding, on the Ottawa River near Renfrew.

★Major prospecting activity in Ontario is in the Patricia district, near Red Lake. More than 30 diamond drills are reported to be in use some properties having two or three machines. Several operators have reported encouraging gold values and two of them have turned up mine-making conditions. Hasaga has found showings in depth exploration that indicate new mill feed. Campbell Red Lake, controlled by Dome Exploration, has located two zones in which gold values merit systematic investigation. Dickenson Red Lake Gold Mines, with $400,000 in its treasury, has located high-grade ore at a point 2,200 ft. East of the Campbell. On the Dickenson ore zone, results from drill hole No. 6 show $8.85 a ton across 43.7 ft. and $16.20 across a width of 44 ft. Heavy overburden has made work slow, dependent on drill holes to give cross-section data. Dome Exploration has optioned the Dexter Red Lake property, west of the Campbell, and has started drilling the new section. In all, 32 properties are either drilling or preparing to start as soon as machines can be shipped in. The camp is expanding rapidly and is the scene of greater activity than any other Ontario area, followed by the section lying between Timmins and Duparquet, across the Quebec line.

★Hoyle Gold Mines, of which Thayer Lindsley is president, has been expanding to the status of a major exploration company by acquisition of various properties formerly held by Frobisher Exploration. To the east of Timmins, Hoyle has secured control of several hundred claims along the Porcupine-Duparquet fault zone, in Hislop Township, east of Matheson. Diamond drilling is in progress on the property of Caman Gold Mines, adjoining the Ross mine, the work being conducted jointly with Noranda Mines. Two other properties in the same township have been taken into the new company, Kelwren Mines. Perry Lake Mines has been formed to take over a large group of claims along the regional structure for a length of 6 miles in a section where deep overburden occurs.

★The property of McMarmac Red Lake Gold Mines is being explored by a series of flat drill holes from the adjoining property of Cochenour Willans Gold Mines. These holes, from a Cochenour North-South drift, are expected to intersect veins previously located by drilling from the ice-covered lake, which was stopped by the break-up.

★Production in the first half of 1945 reported by Preston East Dome Mines amounted to $1,110,535 from 109,901 tons. The mill rate averaged 610 tons daily, compared with 708 in the second quarter of last year, and recovery was up from $8.89 to $10.10 per ton. Mill capacity was increased in 1942 to about 1,000 tons a day, and this is to be resumed when manpower is available. G. G. Campbell is mine manager.

★Dome Mines production totaled $2,419,587 in the first half of the year, as reported by Joseph H. Stovel, general manager. Ore milled in the period was 255,800 tons at an average of 1,421 tons daily, compared with capacity of 1,750 tons. Gold recovery averaged $9.45 a ton, compared with $10.45 in the first half of 1944.

QUEBEC

★Diamond drilling is in progress on the property of Pandora Cadillac Gold Mines, where production stopped in August 1942 after recovery of more than $1,000,000 had been secured. It was reported in July that visible gold was secured in core from the first holes in this new program, which were considered to increase ore reserves of the mine. The area being explored is

between the No. 2 and No. 3 shafts, the latter area having given some encouragement for developing additional tonnage. The present drilling is to be followed by development. D. A. Taylor is president. The Pandora property includes seven claims purchased in 1940 from Amm Gold Mines, which now controls seven adjoining claims.

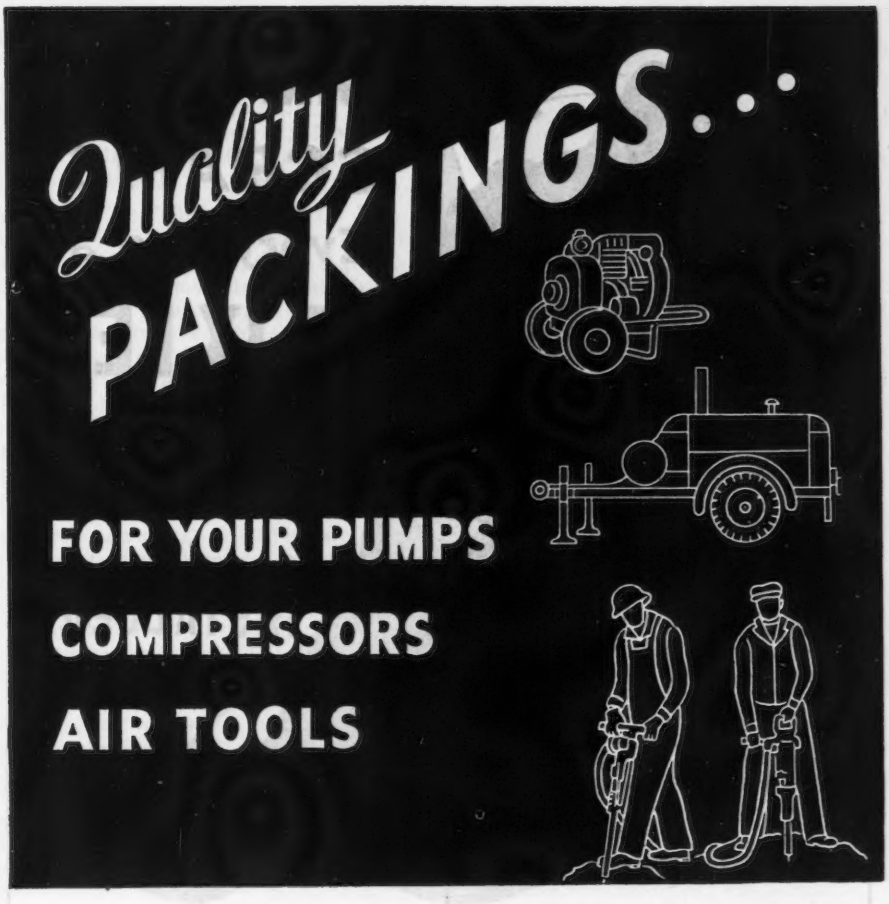
★Theodore Koulomzine, consulting engineer, states that Central Cadillac Mines has started dewatering the shaft. Old workings will be reopened to provide stations for a series of diamond-drill holes. Surface drilling will also be undertaken to explore a favorable zone lying between the Cadillac-Bouzain fault zone and a belt of iron formation to the north.

★S. A. Perry, president of Norbenite Malartic Mines, in Varsan and Malartic townships, has issued a statement on diamond drilling. This work, in progress for more than a year under the supervision of J. P. Norrie, consulting engineer, has been successful in locating several ore zones. Drill hole No. 47 returned an average value of $5.77 for a length of 7.5 ft. and $3.50 a ton over 15.5 ft. In hole No. 49, 100 ft. farther east, values were $6.16 a ton for a core length of 5.5 ft. and $3.47 across 10 ft.

★Joliet-Quebec Mines, formerly Brownlee Mines, in July started sinking a three-compartment shaft on its property adjoining Noranda Mines and Quemont Mining Corporation. The shaft will be put down to 600 ft. and four levels established. The proposed underground program will explore the area bordering Quemont, where an extension of the new copper zone is expected, north of the diabase dike which had formerly been considered to block any northern extension of copper ore beyond the Noranda workings. Diamond drilling several years ago on the Joliet-Quebec holdings indicated a block of low-grade ore amounting to 1,000,000 tons, of which the section along the footwall averaged 2 percent. Diamond drilling is in progress to test anomalies located by a geophysical survey. Joliet is controlled by Forbisher Exploration Co. W. B. Maxwell is president.

★A. St. Germain, president of Gignac Gold Mines, reports the reorganization of the company under the name of Commando Gold Mines. Three groups of claims are held in Privat Township. Diamond drilling was in progress in July, exploring ground located between Trojan and Transterra holdings.

★C. D. H. MacAlpine, president of the Aldermac Copper Corporation, reports the closing down of the Moulton Hill mine, near Sherbrooke, following completion of the contract with the U. S. Commercial Co. on June 30. After a stabilized market has been established for lead, zinc, and copper, it is planned to reopen the mine. Ore reserves have been reported to average 6.27 percent zinc, 2.25 percent



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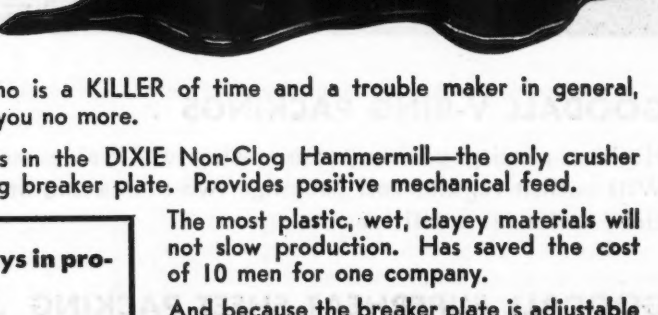

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Canada (*continued*)

lead, 1.52 percent copper, with values in gold and silver. A. V. Corlett is mine manager and C. S. Bolard, mine superintendent.

MANITOBA

★Kiwago Gold Mines, Ltd., reports that diamond-drilling on the Goldhill vein is yielding further encouraging results. This company was formed by Transcan Investors, Ltd., to take in three of the better-known and older properties in the vicinity of Long Lake in the Rice Lake district, 16 miles east of the San Antonio mine—the Kingfisher, the Walton Gold, and the Gold Hill. The program includes drilling on three veins, stripping and trenching on several other gold veins, sinking a prospect shaft to 125 ft on the Valley Vein, and sinking a central shaft on the North-Star-Rex vein system. A. J. McLaren is consulting engineer.

★In the same locality, Hudson Bay Exploration & Development Co., Ltd., a subsidiary of Hudson Bay Mining & Smelting Co., Ltd., is diamond-drilling the Conley group of claims owned by Gencona Mines, Ltd., a gold prospect on which a considerable amount of work was done by Conley Mines, Ltd., the original holders.

★Wolverton Lake Gold Mines, Ltd., is conducting an extensive program of diamond-drilling and other surface work on several gold-bearing veins uncovered by the former owners of its property, situated between Herblet and Wolverton lakes about 6 miles northeast of the Howe Sound property at Snow Lake. The company was formed to take over the merged claims of the Herblet-Hacker and Jay B groups. R. McIntosh is resident engineer.

★Wekusko Consolidated is diamond-drilling the I.X.L. group, a gold prospect in the Island Lake area of northeastern Manitoba. Both San Antonio Gold Mines and the Vulcan Syndicate, headed by John Drybrough, have also acquired extensive holdings in that area recently. Interested companies have financed an aerial topographical survey of the area.

BRITISH COLUMBIA

★Two gold discoveries of note have been reported within the past month, both in the Lillooet mining division. A lode deposit of speculative extent has been found at the headwaters of Seven Mile Creek, near Truax Mountain, in the upper Bridge River district. Numerous samples were taken, which ranged between one-half ounce and one and one-half ounces gold per ton. Float had been known to exist in the area, but this is the first time gold-bearing ores have been found in place. The discovery group was staked by Charlie Ault, well-known prospector, who was grubstaked by several Bralorne residents. The property has been optioned to Bra-

lorne Mines, Ltd., and a diamond-drilling program has been commenced. Other properties in the vicinity have been examined by Privateer Mine, Ltd., and Quebec Gold Mining Corporation.

The other discovery is situated on Phair Creek, in the Cayoosh Creek area, near the town of Lillooet. It consists of ten claims on the same mountain as, and well above, the old Golden Cache mine. The property was staked by Don J. MacNeill, well-known Goldbridge prospector, and Paddy Denehy, of Lillooet. Several veins outcrop, ranging from a few inches to 4 ft. in width, and generously sprinkled with free gold.

★The annual meeting of the B. C. Division, Canadian Institute of Mining and Metallurgy, will be held in Vancouver, on Oct. 24, 25, and 26, 1945. It is scheduled to follow as closely as possible the annual Western meeting of the Institute to be held this year in Edmonton, Oct. 15, 16, and 17. Alan E. Cameron, president, and E. J. Carlyle, secretary, will attend both meetings.

★Net smelter returns of Silbak Premier Mines, Ltd., for June were $47,627, resulting in a gross operating profit of $1,500. Recovery was made after treatment of 5,529 tons, averaging 0.25 oz. gold and 1.88 oz. silver per ton.

★Diamond drilling commenced at the Portland Canal district property of Salmon Gold Mines, Ltd., on Aug. 3, unler the direction of Evan Harris, formerly on the staff of Lake Shore Mines, Ltd. Ice is now out of nearby Summit Lake, making it possible to land supplies. A contract for transportation has been let to Northern Airways, Ltd., of Carcross, Y. T.

★With the Little Billie shaft extended to the 480-ft. horizon, its objective, Vananda Mining Co., Ltd., will drive a crosscut to reach an extensive orebody indicated by diamond drilling. Pioneer Gold Mines of B. C., Ltd., holds operating control of the Vananda company.

★During the quarter ended June 30, Bralorne Mines, Ltd., produced 14,954 oz. gold, valued at $575,729, from 26,003 tons, averaging 0.575 oz. gold per ton. This brings production for the first half of 1945 to 31,684 oz., valued at $1,219,854, from 56,710 tons, averaging 0.559 oz. gold per ton.

★The Pilot mine, Bridge River district, has been dewatered and extension of the crosscut, previously driven 245 ft. from the foot of the 300-ft. shaft, has been resumed. A. B. Wing, president of Pilot Gold Mines, Ltd., states a vein, indicated by diamond drilling to average 5 ft. in width and with a proved length of at least 145 ft., should be reached within 33 ft. of the present face. Drifting will then be done on the vein.

★Shareholders of New Holland Gold Mines, Ltd., have approved the granting of an option to Santiago Mines, Ltd., whereby the latter may obtain 60 percent of Holland stock in consideration of extensive development work to be done on the Holland mine, upper Bridge River district. Majority stock of New Holland is held by Gold Helm Mining Co., of Tacoma.

★Pioneer Gold Mines of B. C., Ltd., Bridge River gold producer and most active of all British Columbia exploration companies, has obtained an option on 1,950,000 shares, equal to 65 percent, in a new company to be known as Proserpine Mines, Ltd., being formed to succeed Proserpine Gold Mines, Ltd. Pioneer will have full control of the management, and will finance the development, of the Proserpine mine, Cariboo mining division.

★North American Goldfields, Ltd., has commenced dragline dredging on its extensive holdings at Beavermouth, on the Quesnel River, Quesnel mining division. The company is also drilling ground on Peters Creek, above Wingdon, where it is planned to operate a second floating-dragline dredge during 1946. North American has taken over the leases held by St. Eugene Mining Corporation, Ltd., on Spanish Creek, on which considerable work has been done and a large yardage of reserves established. All available ground on the numerous Cariboo streams is being staked with former California and Oregon dredging operators taking a leading part.

★Pioneer Gold Mines of B. C., Ltd., is currently operating two diamond drills on its Harrison group, Whitesail Lake district, where spectacular discoveries were made last year.

★Leta Explorations, Ltd., subsidiary of Leitch Gold Mines, is diamond drilling the McKee gold prospect, Omineca mining division.

★Operating profit of The Graney Consolidated Mining, Smelting & Power Co., Ltd., Similkameen mining division, for the second quarter of 1945, was $36,393. After provision of $33,788 for depletion and depreciation, net profit was $2,605. The company has effected an extension until Sept. 30 of its contract with U. S. Commercial Co., whereby the latter purchases the copper concentrate production. The purchasing company has further been granted an option to purchase all output to the end of 1945.

★Owing to congestion at United States' smelters it has been necessary to suspend temporarily the Lucky Jim lead-zinc operation of Zincton Mines, Ltd., wholly-owned subsidiary of Sheep Creek Gold Mines, Ltd. During the shutdown extensive diamond drilling will be undertaken with a view to adding to the extent of probable ore reserves. H. E. Doelle, managing director, is convinced the long-term outlook for zinc is favorable and anticipates no difficulty in marketing the Zincton product, particularly if it is made subject to a tariff of ¾c per

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Canada (*continued*)

pound. The members of the Zincton crew, not required at the Lucky Jim property during the suspension, have been transferred to the Sheep Creek gold mine, where their services are badly needed to bring development up-to-date.

★The Fern gold mine, Nelson mining division, has been acquired on option jointly by Premier Border Gold Mining Co., Ltd., and Quatsino Copper-Gold Mines, Ltd. A diamond-drilling program is in progress under the direction of Harold Lakes, Nelson mining engineer.

YUKON

★Yukon Consolidated Gold Corporation operating in the Klondike produced $616,288 in 1944. A loss of $187,263 was incurred in those operations, compared to a profit of $18,975 in 1943. Its dredges moved 4,348,875 cu. yd. at a cost of 13.75c per yard in 1944. G. G. Hay states that the company will be on a sound financial basis after the war, and that the 1944 loss was unavoidable because of stripping and thawing reserves, and that the company will be free from debenture indebtedness in the future.

★Frank E. Woodside, manager, B. C. and Yukon Chamber of Mines, states that at least 25 large Eastern and American mining companies have sent prospectors into the field to explore placer and gold areas in the Yukon and Northwestern Territories. The men are seeking basemetal deposits to replace the base metals from mines overworked during the war period. Some of the prospectors have been grubstaked to the amount of $300 each.

MEXICO

Mining industry faces difficult conditions—New developments near Chihuahua and Saltillo

★Fall found mining in Mexico functioning at much below the pace of three years ago, when, shortly after Pearl Harbor and Mexico's declaration of war against the Axis powers, (May 28, 1942), this basic Mexican business showed a great spurt. Now, with peace, that demand has considerably slackened. Both the industry and Government are worried about the future of the business.

★Europe, much counted upon by some quarters to take up most of the slack with regard to industrial materials and relieve the falling market for them in the United States, has not as yet made any important move in that direction. It seems that there is still much adjustment to be done in Europe, and a great improvement in the ocean shipping situation, before the Old World will buy much of Mexico's mining products.

★Mining is now somewhat better off with regard to rail transportation as the National Railways, Mexico's largest railroad, has considerably improved its freight service, which was long below par, with the operation of more rolling stock, and the betterment of rights-of-way. Pushing of road building and reconditioning in many regions by the Federal and state governments has also benefited mining.

★Mexico's three chief mining cooperatives are in a precarious situation. The Dos Carlos, pioneer in this field, was established in 1937, and the San Rafael are both at Pachuca, Hidalgo. The Dos Estrellas is at El Oro, State of Mexico. Reports are that they are only able to meet payrolls 60 to 70 per cent, and that they are unable to pay indemnification claims of many members for occupational illnesses, injuries in accidents and other claims ordered by the State and Federal labor boards. Numerous like claims are before these boards. Dos Carlos and San Rafael have an even graver economic problem, the demand of the company that supplies their electric power that they pay an account of more than 600,000 pesos ($125,000). As the power firm is pressing for payment, it is considered in mining circles that unless these cooperatives again obtain cash aid from the State and Federal governments, or from the national miners union, they will be deprived of electricity, which will mean either total suspension or sharp curtailment of their work.

★Guanajuato and Queretaro, traditionally among Mexico's leading mining states, are suffering an acute depression. Guanajuato City business men have asked the State government to aid the building up of small industries, like workshops and fruit cultivation, as well as the development of calcium deposits, as a means of employing numerous miners who have lost their jobs with the closure or sharp curtailment of work by mines. Queretaro's mining has gone down much of late because of the reduced demand in the U. S. for some of its principal products, especially lead, antimony, and mercury. State aid there has also been asked for the miners.

★The national commission for stimulation of the mining industry, obeying instructions of President Camacho, is arranging for the resumption of work at the Santo Niño metal-treatment plant, near Guanajuato City. It recently suspended work because it was unprofitable. The petitions for this action said that closure of the plant had made many miners jobless, besides hampering mining works in the zone of the plant.

★Executives of the national miners union, headed by Juan Manuel Elizondo, the secretary general, have

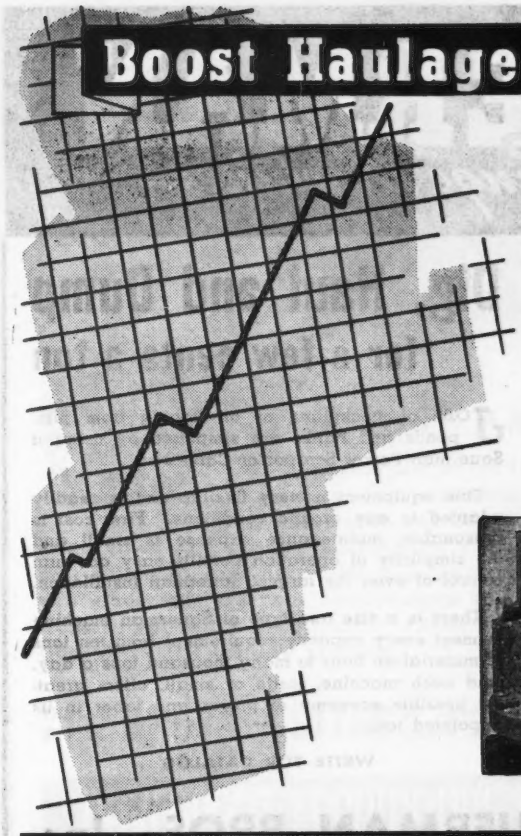
complained to President Camacho that several mining companies still refuse to obey the law enacted on Oct. 1, 1943, that makes compulsory raising the pay of all contract workers in Mexico who earned less than 10 pesos ($2.10) a day. The President ordered the Labor Ministry to investigate the complaint. Several mining companies have told the Government that their revenues do not warrant compliance with this law; others have contended that their business prevents them from obeying it; some have been exempted from obeying the measure, as they proved that if they did so they would have to quit.

★Though the mining cooperative situation is none too good, such societies continue to be organized. The latest is of the employees of El Amparo property, W. Robles, owner, Sabinas, Coaehuila. This property was turned over to its workers to run cooperatively under an arrangement the Labor Ministry made to settle a dispute.

★Government action must be taken promptly to save mining, Mexico's basic industry, contends the Mining Chamber of Mexico in a survey that frankly declares that this industry, which should be doing very well at present, is not prospering as it should. Supporting that contention, the chamber reported a sharp decline during recent years in many phases of mining, such as a drop from 1,309,643 metric tons of ore sent to smelters in 1937 to 904,041 tons shipped last year, and gold and silver production falling from 28,182 and 2,684,063 kg., respectively, in 1940, to 18,614 and 2,022,207 kg. in 1944. The chamber announced its present membership at 217, as compared with 290 in 1942, and said that 25 percent fewer men are now employed in mining than there were eight years ago.

★A promising silver-lead mine near Chihuahua City, that has long been worked by crude methods, has been acquired by Frank Nelson, Los Angeles, Calif., mining man, who has done some operations in Mexico. He expects to improve the mine with modern equipment he is soon to install. The mine has had a good ore production, with showings as high as 38 oz. of silver per ton, and a considerable yield of lead. Some road building is to be done. Nelson expects to have the mine on a working basis in the early fall.

★The National miners union, which claims a membership of more than 85,000 and is Mexico's largest single labor organization, is showing a strong trend toward backing the candidacy for the 1946-52 presidential term of Lic. Miguel Aleman, who recently resigned as Secretary of the Interior. He is the only presidential candidate thus far. Aleman belongs to the same political organization, the Party of the Mexican Revolution, as does President Camacho, whose six-year term expires on Nov. 30,



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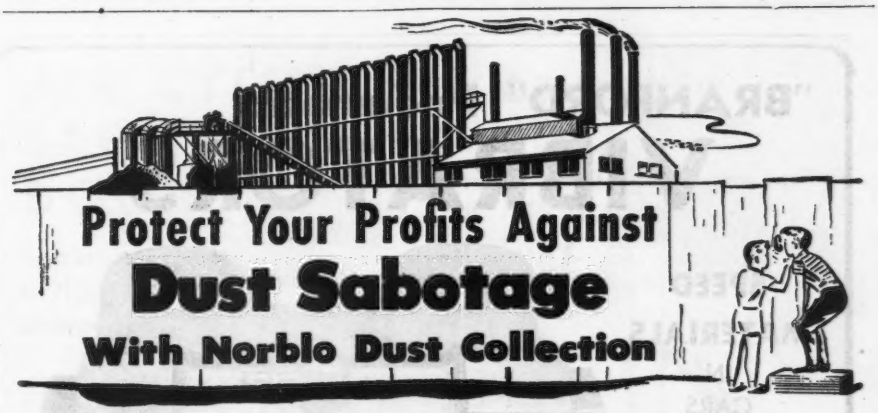

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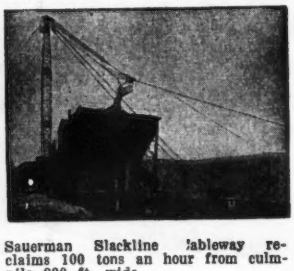

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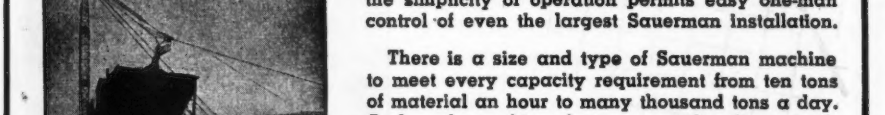

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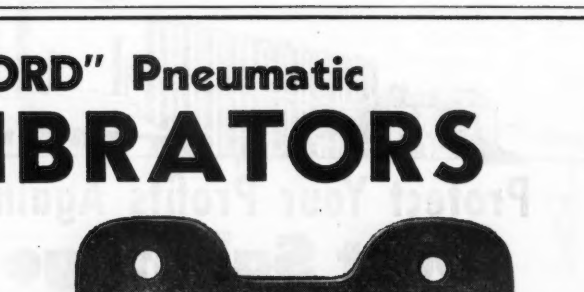

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Mexico *(continued)*

1946. The elections are to be held o the first Sunday of next July.

★Important mining operations ar to be undertaken soon in the Saltil region, Coahuila, by the Houston an Monterrey Mines Co., which was re cently organized by a syndicate o American and Mexican mining me The company has established hea quarters at Saltillo and has a capit of 12,000,000 pesos ($2,485,000). is recruiting workers, which is a slo process because of a considerab manpower shortage in Mexican mi ing, even though many miners hav been deprived of employment.

CHILE

Pending termination of U. S. Com mercial Co. contracts causes u easiness—Tax revenues on co per production decrease

★The Corporación de Fomento (Chi lean RFC) several months ago sen to the Diego de Almagro islan latitude 51 deg. 30 min. south, a expedition composed of several engi neers and geologists to investigat and report on what are said to b among the largest marble deposit known in the South American Cont nent. This island is situated in wha is known as the Hannover archipe ag along one of the numerous Magella channels or fiords that fringe th southern coast of Chile.

★Owing to increased costs, lowe prices, and scarcity of tires, outpu of ores and concentrates has show an alarming decrease during the firs semester of 1945 compared with 194 Production of copper ores has de creased from 80,000 tons for the whol year of 1944 to 22,000 tons for th period January to June 1945; coppe concentrates from 56,400 tons to 22, 000; gold ores from 19,000 to 5,00 tons and gold concentrates from 14. 500 to 5,500 tons. Thus productio of the small mining industry has bee reduced to about half what it was i 1944.

Miners and mining companies hav been unwilling to invest capital in ex ploratory and development work be cause the ore-buying contracts hav been extended during the last yea for very short periods of two an three months only. After very con siderable discussions, the U. S Commercial Co. has extended the or buying contract for August and Sep tember of this year. However, this ex tension considers only the purchas of copper ores and concentrates an gold products are left out for th first time. Under the circumstances Caja de Crédito Minero will take upo itself the burden of buying the gol ores and concentrates.

The termination of the ore buying activities of the U. S. Commercial Co

n Chile, which is announced will be-
in on Oct. 1 next, has caused un-
easiness in mining circles. As all the
mineral production of Chile has been
bought by the U. S. Commercial Co.,
miners fear that some time will elapse
before ore-purchasing activities in
his country will flow back into the
usual prewar channels, due to lack
of shipping facilities. Up to the pres-
ent, none of the old-established
ore-buying firms in Chile is willing to
offer schedules for fear their pur-
chases may have to lay for months
at the ports waiting for bottoms to
transport them to the United States
smelters.

★In an effort to find a smelter for the
gold ores and concentrates which the
U. S. Commercial Co. has been unwill-
ing to buy some time past, Caja de
Crédito Minero (Mining Loan Bank
of Chile), which for the last few
years has been the principal organiza-
tion through which U. S. Commercial
Co. has been buying the mineral pro-
duction of this country, began con-
versations with the Andes Copper Co.
some months ago with the object of
encouraging this company, whose
smelter is located in northern Ata-
cama, to buy at least the gold ores and
concentrates when the U. S. Commer-
cial Co. should cease purchasing in
Chile. After the matter was taken
up with the New York officials by the
vice presidents in Chile Messrs. Cotter
and Michels, a contract for the pur-
chase of the gold concentrates has
been arranged, and this company will
start smelting these concentrates
from Oct. 1, 1945.

Considerable satisfaction has been
expressed in Chilean mining circles at
this arrangement, which will enable
the country to dispose of all the gold
concentrates produced in northern
Chile. It has been fully realized by
the local miners that this is simply an
act of good will and not a commercial
transaction on the part of the Andes
management in order to help the
small mining interests at a time when,
through lack of shipping facilities, no
ore buyers outside the U. S. Govern-
ment can be found. Messrs. Grenin-
ger and Calloway attended to the
technical details of the contract in
Chile on behalf of Andes Copper Co.

★Senator Videla, who represents the
mining provinces of Atacama and
Coquimbo in the Senate, and who is,
president of the Mining Society of
Chile, has recently made two impor-
tant speeches dealing with the status
of the mining industry, both the large,
or American, and the small, or Chilean.
As the mining industry is the pur-
veyor of foreign exchange, his
speeches analyzed the bearing which
a reduction in the exports of mineral
products would have on the Chilean
economy in the postwar period.

Senator Videla stated that under
the most favorable conditions, the
country could export around 360,000
metric tons of copper a year, against
almost half a million tons for the
three years 1942, 43 and 44.

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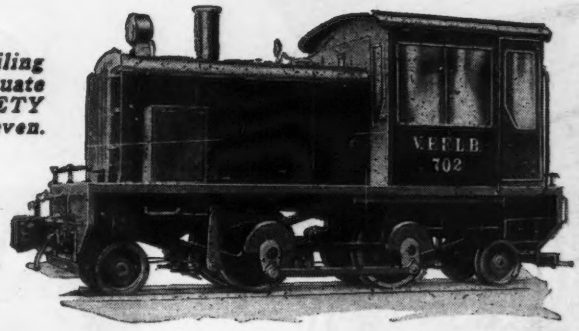

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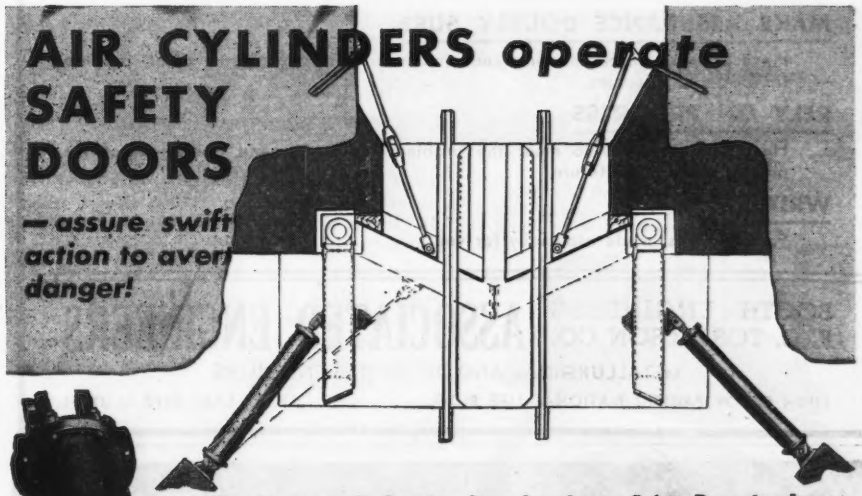

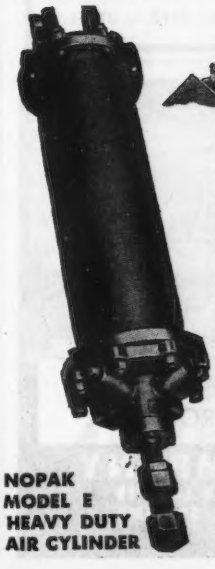

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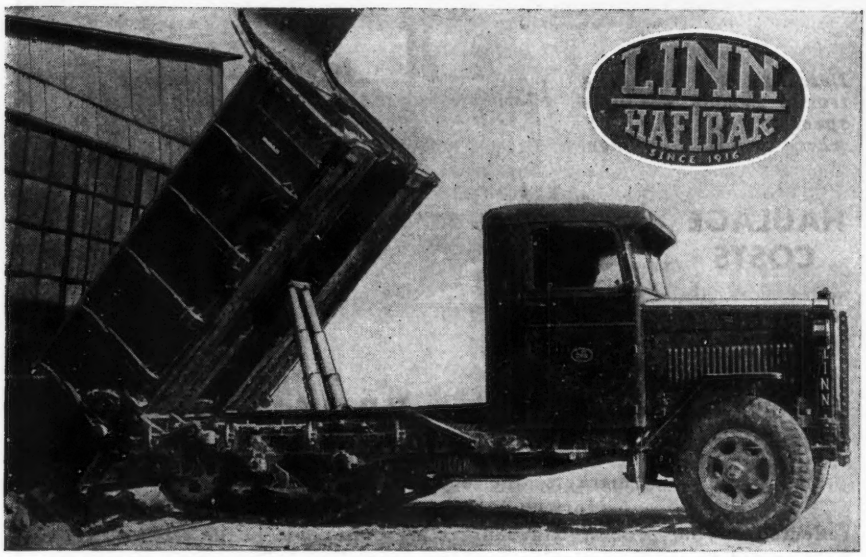

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Chile *(continued)*

he went on to show that the cost of production has increased in Chile in a far greater proportion than in any other of the large copper-producing countries, as proved by the following table:

Year	Tons of Copper Produced by the American Companies	Cost of Production Returned to Chile, U. S. Currency
1941.....	443,050	$25,742,000
1942.....	464,483	34,951,000
1943.....	474,630	43,799,000
1944.....	475,734	44,730,000

This table shows that though production increased only 7.3 percent between the years 1941 and 1944, the quantity of dollars which the three American-owned copper porphyries have had to expend in the country have increased 73.7 percent.

Senator Videla also showed that this steady increase in the cost of production is having an unfavorable influence in the taxes received by the Government. Thus such taxes amounted to US.$25,380,000 in 1943; in 1944 they had decreased to US.$22,613,000 with a slightly greater production.

He also referred to the alarming increase in wages received by the miners, which in a large degree is due to inflation. In Chuquicamata, the average daily wage received by a miner in January 1940 was US.$1.67; in December 1944 it had reached US$3.74, and in Andes Copper figures were respectively US.$1.96 and $3.75. The verdict given recently by the arbitrator who settled the strikes at Potrerillos and Chuquicamata cost each company respectively $925,000 and $875,000 (U.S.) per year. If it is considered that living and working conditions are similar in both mines, but that Chuquicamata has 2,000 men more than Potrerillos and produces about three times more copper than Andes, the arbitrator's decision seems all the more difficult to understand and explain.

★The Compañí Carbonera Victoria de Lebu has given notice to the Government that it will be compelled to shut down its coal mines owing to lack of freight and markets. About 350 miners will be affected by this shutdown.

★The Chilean Institute of Mining Engineers recently discussed the status of the mining industry and presented to the Government a well-conceived plan to help the industry during the forthcoming crisis.

PERU

Cerro de Pasco options Julcani properties—Molybdenum producers shut down—Gold exploration and development under way

★The Julcani mines, in the Department of Huancavelica, and belonging

to Sociedad Minera Suizo-Peruana Julcani, have been taken on option by Cerro de Pasco Copper Corporation. Julcani has two very different types of ore: the sulphides, containing principally silver and lead, which are treated by flotation; and the oxidized ores, with gold as their only value, which are treated by cyanidation. Gold ores are said to be high grade, with excellent possibilities of developing large tonnages. Last year Julcani installed a new cyaniding plant.

★Frank H. Wagner, of Wilkes-Barre, Pa., under contract with the Banco Minero del Peru, arrived in Lima in late July. Mr. Wagner, a well-known coal expert, who came to Peru in late 1943 with the Morfit Commission, to study the possibilities of installing a steel industry in Chimbote, is to make a detailed report on the coal exporting possibilities of the Chimbote and Oyon coal fields. If conclusions are favorable, Mr. Wagner will take charge of directing exploitation of these fields on a large scale. The Banco Minero, which has for some time been developing the Oyon fields, has ordered a coal cleaning plant.

★Peru Molibdeno, S. A., the largest Peruvian producer of molybdenum, ceased operating last month, mainly because of the cancellation of the Metals Reserve Co. contract for the purchase of molybdenite concentrates. Although the company found ready markets for its product in England and Germany before the war, higher costs of production, together with a decrease in the grade of the ores, made operations increasingly difficult.

★The Cachi-Cachi gold placers, in the Sandia region of southern Peru, long famous for their high-grade gravels, are being prospected by an American engineer who represents a large group. Cachi-Cachi consists of high benches of gold-bearing gravels. Main difficulties have always been water supply and transportation.

★La Capitana mine, formerly Tocota, about 25 miles inland from the port of Chala, about 400 miles south of Lima, and belonging to a group headed by Martin Heller and Leon Rosenshine, is about ready to erect a cyanidation plant. The mine has been under process of development for the last few years. Ore is said to be abundant and very high grade (about 0.6 oz. gold).

AUSTRALIA

Western Australia maintains good output—Potash from alunite development progresses

WESTERN AUSTRALIA

★Considering the incidence of wartime conditions, and restrictions that have not been in any way relaxed, the

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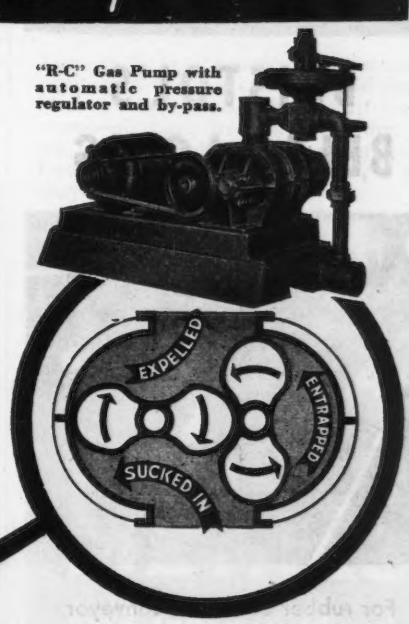

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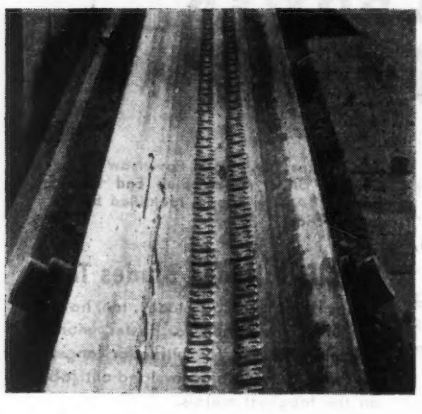

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Australia *(continued)*

shortage of manpower and the great difficulty in obtaining stores and replacements, the output of gold and other minerals in Western Australia during 1944 was remarkably high, according to the annual report of the Department of Mines. Existing conditions are even more difficult since the close of the year; cyanide, quicksilver, and copper sulphate are in short supply and great delay is experienced in obtaining machinery replacements for the gold-mining industry, owing to its low priority, and manpower and shipping difficulties. The value of all minerals produced was £A5,735,671 (inclusive of the premium on gold), a decrease of £A667,386 compared with the previous year. Of this total the value of gold produced was £A4,899,997, or 85.43 percent of all minerals. Other minerals sought for have increased in the past few years, though some are in small quantity. In order of importance these metallic minerals are: Coal, pyrite, arsenic, tungsten ores, silver, alunite, phosphatic guano, asbestos, felspar, beryl, red ochre, gypsum, glauconite, clays, antimony, mica, soapstone, dolomite, vermiculite, bentonite, copper, glass sand, tantalite, and tin. The two last are of greater importance than their position indicates, owing to incomplete realization figures. Dividends paid by mining companies increased by £A814,715, bringing the total distribution by gold-mining companies to £A41,284,664. The total value of the State's mineral production at the end of the year amounted to £A230,924,485, to which gold had contributed £A211,321,534. These figures are based on normal values and would be increased by premium on gold by £A60,126,047. Gold ore milled in 1944 amounted to 1,777,128 tons, which was 2,514,581 tons less than the output in 1940. The calculated average value of ore treated throughout the State was 22.604 s. per ton, valuing gold at £4-4-11.45 per fine ounce, but the average premium received over the twelve months covered by the report, amounting to 147.4 percent, would more than double this estimate. Several more of the larger mines were forced to close down during the year. Of 60 companies which were members of the Western Australian Chamber of Mines in the first year of the war, 25 are now idle, and the proportion of the smaller producers, not affiliated with the chamber, is probably much greater. Mines which have forced to close down through war conditions are being maintained by Government funds in such a condition as will enable them to reopen with a minimum of delay when sufficient manpower is again available. Improvement in the war aspect has encouraged interest by some companies in prospective new mines, and some exploratory work, including diamond drilling was undertaken toward the end of the year.

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BULLETIN 551

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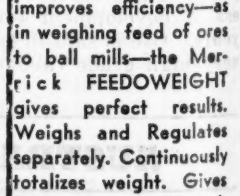

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★The youngest of the State's ventures is the production of potash from alunite. The raw material is a dark-gray clay which occurs in the bed of Lake Campion, on which the township and works are situated, 32 miles north of the town of Merredin, on the railway from Perth to Kalgoorlie. Lake Campion is 400 acres in extent and contains 12,000,000 tons of alunitic clay, which has been bored to a depth of 20 ft. without reaching the bottom of the deposit. The clay is estimated to contain 1,500,000 tons of potassium sulphate and 2,000,000 tons of alumina, apart from byproducts. A typical analysis of the washed clay is:

	%
SiO_2	21.17
Al_2O_3	27.47
Fe_2O_3	2.27
MgO	0.47
K_2O	7.24
Na_2O	0.78
SO_2	26.47
P_2O_5	0.17
Cl	0.98
TiO_2	0.12
H_2O (comb.)	12.43
Organic	0.58

Annual rainfall is 10 in. during the winter months, when the lake carries a depth of from 4 in. to 10 in. of water, which rapidly disappears, the final water level being 30 in. below surface. The alunite above water level contains about 20 percent free moisture with a high percentage of sodium and magnesium chlorides. The clay is ploughed, and exposed to atmosphere for reduction of moisture to about 13 percent, and is scraper-loaded for transfer to the plant, where, after crushing, it goes to a 6,000-ton storage bin. Roasting is done in a 147 x 7 ft. rotary kiln, fired by producer gas, the wood fuel being obtained within a radius of 35 miles of the works. Sizing of the feed is a most important factor in successful operations. It is stated that Lake Campion alunite differs greatly in its behavior during roasting from the Utah deposits in U.S.A. Utah alunite is described as remarkably pure, whereas the Campion alunite contains 21 percent SiO_2, which impurity, with the slightest over roasting, reacts with the potassium sulphate, tending to render the potash insoluble. The subsequent leaching is by a cyclic process. A process has been developed at the University of Western Australia for the production of refined alumina, and a large-scale pilot plant has been built. The power plant at the works is diesel-electric, with a steam-electric standby unit. Water is obtained from the 30-in. main of the Goldfields Water Supply, which passes at a distance of 32 mines, and is connected with the works at Lake Campion by a 6-in. branch main.

NEW SOUTH WALES

★The State's largest gold mine, and one of the leading mines in the Commonwealth, is New Occidental Gold Mines, N.L., at Cobar. The ore in the New Occidental itself is a clean gold ore, but the company has been working two adjoining mines producing copper-gold ore. These two mines, the New Cobar and the Chesney, were operated to increase the supply of copper for war purposes. Stopping in the New Occidental mine is carried out above the No. 12, or 1,487 ft., level, and blast-hole drilling has been successfully introduced during the year, 2-in. coring bits having lately been substituted for solid bits. Exploratory diamond drilling below No. 12 level has intersected the lode at a depth of 1,687 ft., assaying 9.1 dwt. gold per ton over a true width of 60 ft., and again at 1,817 ft., where the value was 7.3 dwt. and the width of ore 55 ft. Ore reserves are estimated at 315,777 tons of positive ore, assaying 7.9 dwt. gold per ton, and 265,403 tons of probable ore, making a total reserve of 581,180 tons. In the year's operations the mill treated by cyanidation 72,662 tons of ore of an average head value of 8.849 dwt. per ton for the recovery of 28,517 oz. of gold, valued at £A299,440; assay value of tailings was 1.015 dwt. per ton and the recovery 88.53 percent. Costs were:

	Per Ton
Ore extraction	19s. 9.06d.
Development	4 0.81
Treatment	19 2.25
Total	43s. 0.12d.

Owing to shortage of labor, no development was carried out during the year, and it has now been decided to suspend production for 12 months and concentrate all labor on development work. The New Cobar mine, on which work is to be continued, contains reserves of 66,603 tons of ore having an average assay value of 4.87 dwt. gold per ton and 1.32 percent copper. The deepest level is No. 9. The mine contains ore sufficient for one year's extraction, but diamond drilling is proceeding to explore the mine at depth. Ore is treated in a special flotation plant on the New Occidental section of the properties, and during the year 25,528 tons were treated. Head value was 6.416 dwt. gold per ton and 1,611 percent copper. Concentrates produced totaled 2,868 tons containing 6,691 oz. of gold and 405 tons of copper, valued at £A107,725. Recoveries were 81.707 percent of gold and 98.435 percent of copper.

★The Chesney mine produced 38.888 tons of ore for the year. The average value of the ore milled was 3.594 dwt. gold per ton and 2.291 percent copper. Concentrates totaled 3,681 tons, containing 5,733 oz. of gold and 881 tons of copper, valued at £A154,784. Recoveries were 82.028 percent gold and 98.892 percent copper. Costs for the two copper sections, in tons, were:

	New Cobar		Chesney	
Ore extraction	28s.	11.28d.	24s.	6.04d.
Development	11	11.07	2	10.49
Treatment	16	3.72	15	5.36
Total	57s.	2.07d.	42s.	9.89d.

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THIRTY YEARS SERVICE TO THE MINING INDUSTRY IN THE MARKETING OF ORES AND THE SUPPLY OF MINING EQUIPMENT AND SUNDRIES

Australia *(continued)*

Extensive geological work has been done during the year and it is stated that there is an excellent chance of discovering repetition orebodies in the properties by deep diamond drilling. Operations on all the mines were seriously affected by manpower shortage and absenteeism is becoming increasingly prevalent.

★In the past 20 years the Broken Hill mining companies have improved the working conditions of their employees and advanced the social and civic aspects of their lives. Lately the companies are sponsoring dental service. For the first six months this service will be for employees only, but will then be available for their wives and families. The scheme will be financed by a contribution of 3d. per week per employee, subsidized by the companies to a similar amount, and a small charge will be made for dental work. As soon as Government restrictions on building are removed, the mining companies will erect and equip a suitable building for the clinic, the work of which, meantime, will be carried out in rented premises.

TASMANIA

★The Tasmanian Department of Mines gives the value of minerals and metals produced since the beginning of mining operations to Dec. 31, 1944, as £A90,782,884, and for the year ended on that date as £A3,166,245. The State produces about 1,000 tons of metallic tin annually, and the total output since the discovery of cassiterite is 132,042 tons, valued at £A20,526,858, of which the Mount Bischoff mine contributed an output worth £A6,224,185. Wolfram production is still maintained in the Storey's Creek district, where the ore is high grade, and the two largest mines promise a good future. The center of scheelite production is King Island, where King Island Scheelite, N. L., is working a deposit, in which 1,200,000 tons of ore have been proved, and the new 20,000 tons per month mill is now in production. Although the output of silver-lead has declined, production since 1915 has amounted to 154,327 tons, worth £A3,576,148, the output prior to that date being valued at £A6,429,291. In that period, the Zeehan field was the great producer, but since 1915 the Read-Rosebery mines, on the West Coast, have been the main source of supply, and have reserves approximating 1,500,000 tons of ore. The Department of Mines has commenced an extensive program of structural and aerial surveys directed to the better interpretation of ore deposits as well as to locate new ore occurrences and to trace possible extensions of orebodies which do not appear at surface. Much of the island is rugged, and the topography and vegetation are such as to make prospecting difficult and arduous. Road construction will be necessary.

Open-pit Iron Reserves

(Continued from Page 106)

by a flat increase in the Lake Erie price of ore, or by combining a reduction in taxes on ore and reduction in Upper Lake rail freight rates on ore with an increase in Lake Erie iron-ore prices.

Postwar rehabilitation will require a sustained production of iron ore, Mr. Van Slyke points out, which if continued at present or near-present rates for a relatively few years, will reduce Mesabi open-pit reserves to such a low point that it will be impossible to increase output fast enough to meet another crisis.

He maintained that an increase in ore values would permit the mining of underground reserves totaling 300 to 400 million tons on the Mesabi, and utilization of seemingly inexhaustible low-grade ores, chiefly taconite, which require heavy investment in beneficiation plants. The advisability of placing floors under values should also be considered by the Government, he suggested, to encourage high-cost low-grade production.

Restrictions on Metals Revoked by WPB

That WPB intends to eliminate all war restrictions as speedily as possible was seen in action taken during the last week that resulted in the revocation of 210 controls. Included among the commodities freed of control, effective Aug. 20, are copper (M-9); rhodium (M-95); platinum (M-162); osmium (M-302); silver (M-199); zinc (M-11); cadmium (M-65); lead and tin scrap (M-72); bismuth (M-276). Metals of importance still under control include lead, tin, and antimony.

Norwegian Mineral Exports Ready for Shipment

Norwegian exports are making rapid recovery, according to reports of the Foreign Economic Administration. Fish, metals, minerals, and fertilizers available in large quantity in spite of the recent extended military occupation of the country.

During the last four months of the year it has been estimated by Government experts that one million tons of metals, minerals, and fertilizers may move out of Norway. The total quantity exported depends on availability of coal and other materials. At the time the report was made, nearly 350,000 tons were on hand for immediate shipment.

"In order of tonnage available, they are pyrites, iron concentrates, nitrate fertilizers, cyanamid, ilmenite, copper and copper concentrates, ferro-alloys, and carbide. In addition, there are substantial quantities of molybdenite, graphite concentrates, nickel, talcum, mica, and feldspar."